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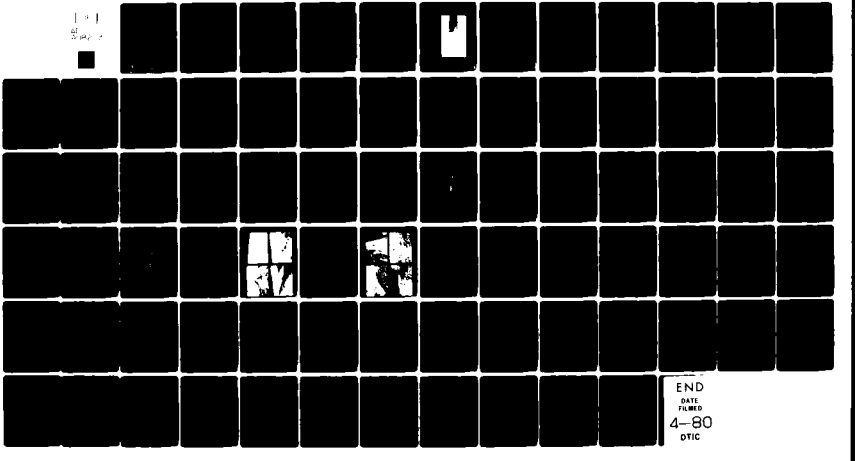

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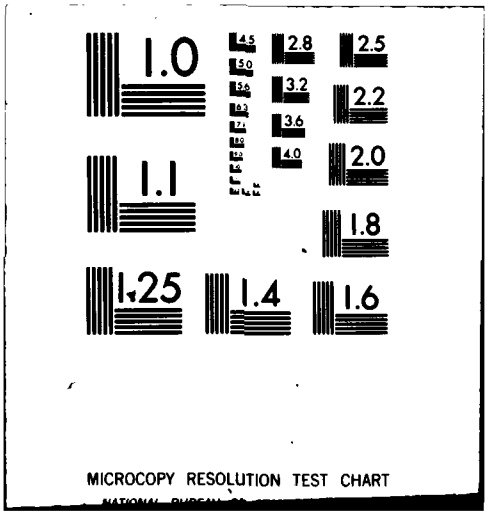
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SUSQUEHANNA RIVER BASIN
BIG POE CREEK, CENTRE COUNTY

PENNSYLVANIA

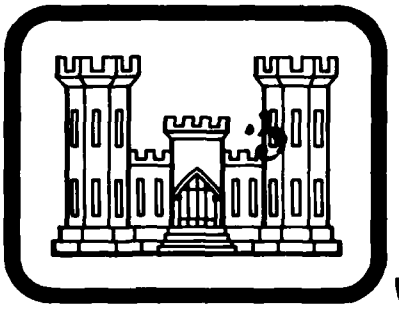
POE DAM

LEVEL II

NDI I.D. No. PA-00471
PENNDER I.D. No. 14-105

DACW 31-80-C-0016

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



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PREPARED FOR

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

PREPARED BY

GAI CONSULTANTS, INC.
570 BEATTY ROAD
MONROEVILLE, PENNSYLVANIA 15146

JANUARY 1980

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topograhic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the downstream damage potential.

(6) National Dam Safety Program. Poe Dam (NDI I.D. Number PA-00471, PennDer I.D. Number 14-105), Susquehanna River Basin, Big Poe Creek, Centre County, Pennsylvania.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

ABSTRACT

(11) Jan 80

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Poe Dam: NDI I.D. No. PA-00471

Owner:	Commonwealth of Pennsylvania, Department of Environmental Resources (PennDER)
State Located:	Pennsylvania (PennDER I.D. No. 14-105)
County Located:	Centre
Stream:	Big Poe Creek
Inspection Date:	29 November 1979
Inspection Team:	GAI Consultants, Inc. 570 Beatty Road Monroeville, Pennsylvania 15146

(15) DACW31-80-C-0016

Based on a visual inspection, operational history, and available engineering data, the dam is considered to be in good condition.

The size classification of the facility is small and the hazard classification is considered to be high. In accordance with the recommended guidelines, the Spillway Design Flood (SDF) for this facility ranges between the 1/2 PMF (Probable Maximum Flood) and the PMF. Due to the high potential for damage to downstream structures and possibly loss of life, the SDF is considered to be the PMF. Results of the hydrologic and hydraulic analysis indicate the facility will pass and/or store approximately 75 percent of the PMF prior to embankment overtopping. As a result, the spillway is deemed inadequate, but not seriously inadequate.

It is recommended that the owner immediately:

a. Retain the services of a registered professional engineer experienced in the design and construction of earth embankments to evaluate the seepage reportedly observed on occasion to the right of, and near the outlet conduit headwall.

411

b. Assess the extent of corrosion of the corrugated metal pipe outlet conduit and implement measures to repair the condition, if necessary.

c. Continue to observe the seepage emanating about 150 feet downstream of the embankment toe in future inspections and specifically note any changes in turbidity or flow rate.

d. Develop a formal operation and maintenance manual to ensure the continued proper care of the facility. Included in the manual should be a formal emergency warning system with provisions for around-the-clock surveillance of the facility during periods of unusually heavy precipitation. It is noted that some provisions for warning downstream inhabitants in the event of an embankment emergency have already been developed. The plan should be formally submitted to the PennDER, Division of Dam Safety, for approval or revision.

GAI Consultants, Inc.

Bernard M. Mihalcin, P.E.

Date 12 FEB 1980

Approved by:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date 12 March 1980

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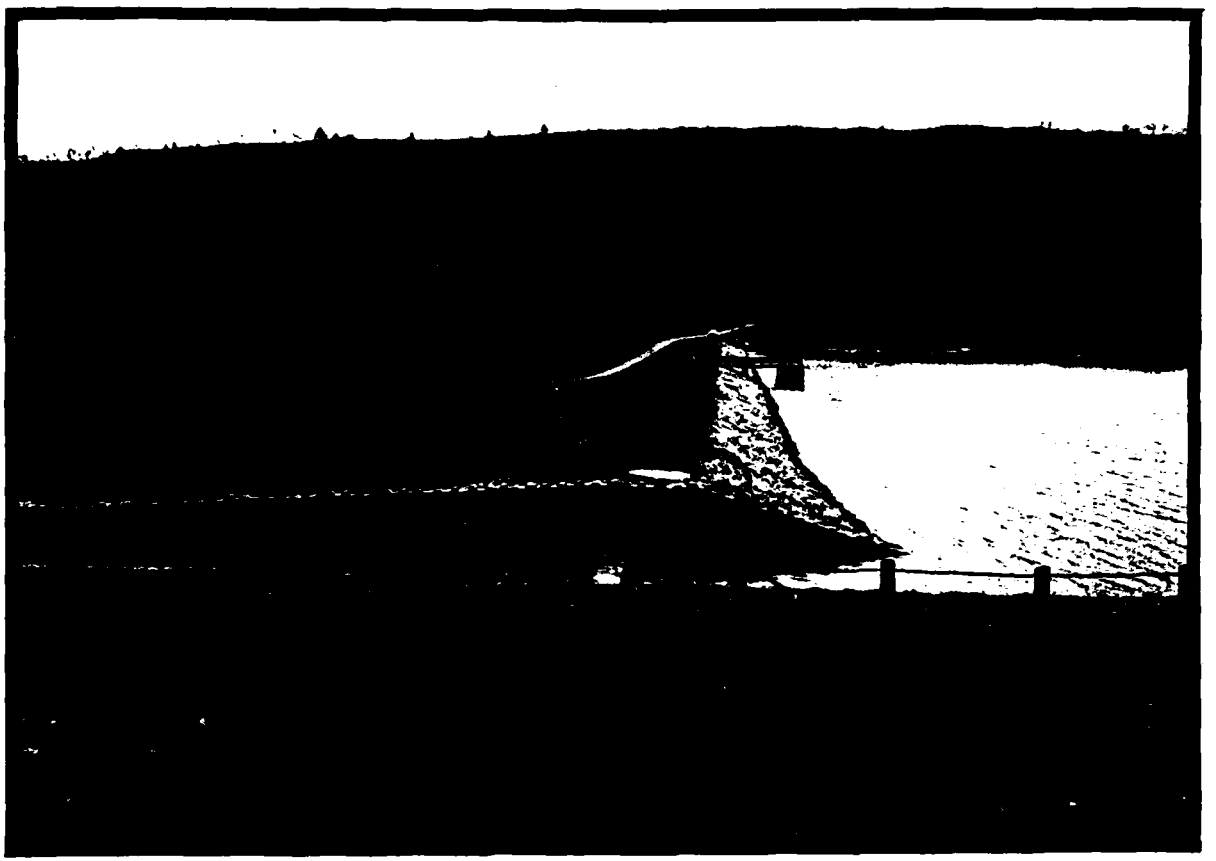


OVERVIEW PHOTOGRAPH

TABLE OF CONTENTS

TABLE OF CONTENTS

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
POE DAM
NDI# PA-00471, PENNDER# 14-105

SECTION 1
GENERAL INFORMATION

1.0 Authority.

The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

1.1 Purpose.

The purpose is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Poe Dam is a 33-foot high earth embankment approximately 705 feet long, including spillway. The facility is served by an uncontrolled, masonry, chute channel spillway with a concrete, ogee-like weir located at the left abutment. The length of the spillway crest is 60 feet. Drawdown control is provided by a 30-inch diameter, concrete encased, corrugated metal pipe (CMP) which is valved at the inlet within a control tower located on the upstream embankment slope.

b. Location. Poe Dam is located in Poe Valley State Park on Big Poe Creek in Penn Township, Centre County, Pennsylvania. The facility is situtated approximately 5 miles south of Coburn, Pennsylvania, and about 10 miles northeast of U. S. Route 322 near Potter's Mills, Pennsylvania. The dam, reservoir, and watershed are contained within the Coburn and Spring Mills, Pennsylvania, 7.5 minute U.S.G.S. topographic quadrangles (see Figures 1 and 2, Appendix E). The coordinates of the dam are N40° 49.4' and W77° 28.1'.

c. Size Classification. Small (33 feet high, 740 acre-feet storage capacity at top of dam).

d. Hazard Classification. High (see Section 3.1.e).

e. Ownership. Commonwealth of Pennsylvania
Department of Environmental Resources
Harrisburg, Pennsylvania

f. Purpose. Recreation.

g. Historical Data. Poe Dam was constructed between 1935 and 1938 by the Civilian Conservation Corps under the supervision of the Pennsylvania State Forest Service. Little formal data are available that pertains to the original design of the facility. However, considerable correspondence related to construction estimates and several construction photographs imply that the facility was designed and constructed in accordance with generally accepted modern practice.

The facility has been inspected on a regular basis since its completion and has reportedly functioned adequately over the years. Deficiencies which have been consistently noted include displaced riprap and walking paths worn along the downstream embankment face. Available corrspondence indicates these minor deficiencies were usually corrected at the conclusion of the summer recreation season.

Seepage below the dam, between the spillway and blow-off, has been noted yearly since 1968. The problem was thoroughly investigated by the state in the fall of 1969, the results of which were reported in correspondence contained in PennDER files dated October 27, 1969. The study measured the total rate of seepage under normal conditions at about 12.5 gallons per minute (gpm). It was concluded that at least 90 percent of the seepage or about 11 gpm originated in the area between the spillway weir and discharge end of the spillway. The remaining seepage likely originates along the spillway approach channel. Flow through the earth portion of the embankment was considered minimal. In order to eliminate marshiness in the area downstream, gravel underdrains were subsequently installed.

The largest storm of record at the facility occurred in June 1972 when it was reported that approximately 4 feet of water flowed over the spillway weir. No appreciable flood damage was sustained; however, the Park Superintendent reported that during the storm a flow of water was observed "shooting out" of the ground surface just to the right of the outlet structure. No flow or wet area was in evidence during the annual inspection the following year. Discussions with the present Park Foreman indicate that flow in this area has been observed several times since 1972 and seems to occur during storms that produce heavy runoff from the

adjacent left abutment hillside. This reported flow has not necessarily been associated with high pools.

1.3 Pertinent Data.

a. Drainage Area (square miles). 4.9

b. Discharge at Dam Site.

Discharge Capacity of the Outlet Conduit - Discharge curves are not available.

Discharge Capacity of Spillway at Maximum Pool ≅ 4490 cfs (see Appendix D, Sheet 12).

c. Elevation (feet above mean sea level). The following elevations were obtained through field measurements based on the elevation of normal pool at 1285 feet as estimated from U.S.G.S. 7.5 minute topographic quadrangle, Coburn, Pennsylvania (no formal drawings are available).

Top of Dam	1293.8
Maximum Design Pool	Not known
Maximum Pool of Record	1289 (June 1972)
Normal Pool	1285
Spillway Crest	1285
Upstream Inlet Invert	Not known
Downstream Outlet Invert	1260.4
Streambed at Dam Centerline	Not known
Maximum Tailwater	Not known

d. Reservoir Length (feet).

Top of Dam	2800
Normal Pool	2050

e. Storage (acre-feet).

Top of Dam	740
Normal Pool	460
Design Surcharge	Not known

f. Reservoir Surface (acres).

Top of Dam	41
Normal Pool	23
Maximum Design Pool	Not known

g. Dam.

	Type	Zoned earth.
	Length	705 feet (including spillway).
	Height	33 feet (field measured; crest to downstream outlet invert).
	Top Width	15 feet.
	Upstream Slope	2.5H:1V
	Downstream Slope	1.75H:1V
	Zoning	Available correspondence indicates embankment was constructed with an impervious core comprised of "at least 40 percent clay" and a downstream rock toe. No additional data is available.
	Impervious Core	See "Zoning" above.
	Cutoff	Not known.
	Grout Curtain	Not known.
h.	Diversion Canal and Regulating Tunnels.	None.
i.	Spillway.	
	Type	Uncontrolled masonry chute channel with a concrete ogee-like crest.
	Crest Elevation	1285 feet.
	Crest Length	60 feet.
j.	Outlet Conduit.	
	Type	30-inch diameter C.M.P. encased in concrete.

Length	160 feet (estimate).
Closure and Regulating Facilities	Control is provided via 30-inch diameter gate valve on the upstream end of the conduit. Operation is from atop the control tower.
Access	Control tower is accessible from the embankment crest via wooden footbridge.

SECTION 2
ENGINEERING DATA

2.1 Design.

a. Design Data Availability and Sources. No design data, calculations, or design reports are available. Limited data pertaining to the design features of Poe Dam are contained within PennDER files in the form of construction cost estimates, state inspection reports, dated photographs, and miscellaneous correspondence. No design or construction drawings are available.

b. Design Features.

1. Embankment. Based on information contained in PennDER files, general statements can be made regarding the embankment design. References (as late as 1968) are made to a set of three original design drawings from 1936 which are presently unavailable. Correspondence referencing these drawings indicate the dam to have been conventionally designed with an impervious clay core and a downstream rock toe. Construction photographs show the embankment being placed in layers and compacted with a sheepsfoot roller. The upstream slope is covered to the embankment crest with durable, hand-placed, sandstone while the downstream slope is covered with grass. The embankment crest is protected with a layer of crushed stone. No formal data are available pertaining to the design of the embankment foundation, but, general correspondence indicates that permeable soils were removed (presumably below the clay core).

2. Appurtenant Structures.

a) Spillway. The spillway is a rectangular channel constructed of rough sandstone masonry with an uncontrolled, concrete, ogee-like crest. The channel is approximately 132 feet long from the weir to its discharge end. The approach area extends 36 feet upstream of the weir. Available construction photographs show the right wingwall is keyed into the embankment and correspondence indicates the spillway structure is founded on rock.

b) Outlet Conduit. The outlet conduit consists of a 30-inch diameter corrugated metal pipe encased in concrete controlled by a 30-inch diameter gate valve. Construction photographs verify the use of concrete in the outlet. The valve is housed at the base of a masonry tower located on the upstream embankment slope and is operated from atop the tower deck. The conduit discharges at the

downstream embankment toe where it empties into a 30-foot long, trapezoidal-shaped, masonry-lined channel.

c. Specific Design Data and Criteria.

1. Hydrology and Hydraulics. No design data or information relative to design procedures are available. A memorandum dated July 17, 1935, which presented a review of the original design drawings, recommended that the spillway be re-designed to accommodate a flow of 4,000 cfs while providing 2 feet of freeboard.

2. Embankment. None available.

3. Appurtenant Structures. None available.

2.2 Construction Records.

Available construction records are limited to 18 photographs and various memoranda dated 1935 through 1938 contained in PennDER files. A 1935 memorandum emphasized the importance of moisture control and proper compaction of the embankment materials.

2.3 Operational Records.

No records of the day-to-day operation of the facility are maintained.

2.4 Other Investigations.

The facility has been inspected on a regular basis since its completion in 1938. Reports resulting from these inspections are contained in PennDER files.

In the fall of 1969, the origin of seepage beyond the downstream embankment toe was investigated by the Pennsylvania Department of Forests and Waters, Division of Flood Control. Results of the investigation are summarized in a letter report entitled, "Investigation of Seepage at Poe Valley State Park Dam," dated October 27, 1969. This report is also contained in PennDER files.

2.5 Evaluation.

The information available is considered adequate to make a reasonable Phase I assessment of the facility.

SECTION 3
VISUAL INSPECTION

3.1 Observations.

a. General. The general appearance of the facility suggests the dam and its appurtenances are in good condition.

b. Embankment. The visual inspection indicates the embankment to be well maintained and in excellent condition. No evidence of sloughing, erosion, animal burrows, excess settlements, seepage through the embankment face, or signs of maintenance neglect were observed (see Photographs 1 and 2). An area of seepage was observed approximately 150 feet beyond the downstream embankment toe and about 150 feet to the right of the spillway (see Photograph 8). This seep roughly corresponds to similar seeps referenced in state inspection reports dating back to 1968. The rate of seepage observed by the inspection team was estimated at approximately 1 cfs.

c. Appurtenant Structures.

1. Spillway. The spillway is considered to be in excellent condition. No evidence of exterior deterioration was observed (see Photograph 3).

2. Outlet Conduit. The outlet conduit is currently in fair condition. Extensive corrosion was observed at its outlet end; however, the pipe is reportedly encased in concrete. The gate valve was operated in the presence of the inspection team and appears to be in good condition as does the masonry control tower (see Photographs 5 and 6). Some minor cracking was observed in the masonry headwall at the discharge end of the outlet conduit (see Photograph 7).

d. Reservoir Area. The general area surrounding the reservoir is characterized by steep slopes that are heavily forested. No signs of slope distress were observed.

e. Downstream Channel. The channel downstream of Poe Dam is contained within a narrow, heavily forested valley with steep confining slopes. The valley contains several hunting cabins and a gun club lodge within the approximate 3-mile reach between the embankment and Penns Creek. At the confluence of Big Poe Creek and Penns Creek there is a camping and recreational area known as Poe Paddy. The population of the valley varies considerably with the season; however, it is possible that many persons could be affected by an unexpected embankment breach. Thus, the hazard classification of the facility is considered to be high.

3.2 Evaluation.

The overall appearance of the facility suggests it to be in good condition. For the most part, the facility is well maintained. Deficiencies noted by the inspection team included a corroded outlet pipe and cracked outlet masonry headwall. Both conditions require corrective action. In addition, seepage was observed downstream of the embankment. The condition is considered minor at this time; however, it should be observed and noted in future inspections.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Normal Operating Procedure.

Poe Dam is essentially a self-regulating facility. Excess inflow is automatically discharged through the uncontrolled spillway. The outlet conduit is operated by park personnel annually or as-needed. No formal operating manuals are associated with the facility.

4.2 Maintenance of Dam.

The facility is well maintained, but, on an unscheduled basis. Most major maintenance is performed either just prior to or immediately after the summer park season. No formal maintenance manual is available.

4.3 Maintenance of Operating Facilities.

See Section 4.2 above.

4.4 Warning System.

Park Superintendent G. F. Resides has developed a brief written plan of action for use in the case of a flood emergency. The plan provides for an on-duty park employee to visually assess the extent of danger potential at the dam during a flood emergency. It is then his responsibility to warn all those persons camping between the dam and Poe Paddy located about 3 miles downstream. The plan specifies the warning alarm be by vehicle horn and voice instruction.

4.5 Evaluation.

The facility has a history of adequate maintenance and operation. Formal manuals of operation and maintenance are, nevertheless, recommended to ensure the continued proper care and operation of the facility. Some provisions for warning downstream inhabitants in the case of a flood emergency have been developed. The plan should be formally submitted to the PennDER, Division of Dam Safety, for approval or revision.

SECTION 5
HYDROLOGIC/HYDRAULIC EVALUATION

5.1 Design Data.

No design data, calculations, or design reports are available for the facility. A memorandum in PennDER files dated July 17, 1935, states that the spillway should be designed to pass 4000 cfs with a 2-foot freeboard.

5.2 Experience Data.

Information contained in PennDER files indicate the largest flood of record at Poe Dam to have occurred in June 1972. At that time, flow over the spillway weir was estimated at approximately four feet (the spillway provides 8.8 feet of freeboard at the weir). The facility reportedly functioned adequately during the event and no significant damage was sustained.

5.3 Visual Observations.

On the date of inspection, no conditions were observed that would indicate the spillway could not function satisfactorily during a flood event, within the limits of its design.

5.4 Method of Analysis.

The facility has been analyzed in accordance with the procedures and guidelines established by the U. S. Army, Corps of Engineers, Baltimore District, for Phase I hydrologic and hydraulic evaluations. The analysis has been performed utilizing a modified version of the HEC-1 program developed by the U. S. Army, Corps of Engineers, Hydrologic Engineering Center, Davis, California. Analytical capabilities of the program are briefly outlined in the preface contained in Appendix D.

5.5 Summary of Analysis.

a. Spillway Design Flood (SDF). In accordance with the procedures and guidelines contained in the National Guidelines for Safety Inspection of Dams for Phase I Investigations, the Spillway Design Flood (SDF) for Poe Dam ranges between the 1/2 PMF (Probable Maximum Flood) and the

PMF. This classification is based on the relative size of the dam (small), and the potential hazard of dam failure to downstream developments (high). Due to the high potential for damage to downstream structures and possibly loss of life, the SDF for this facility is considered to be the PMF.

b. Results of Analysis. Poe Dam was evaluated under near normal operating conditions. That is, the reservoir was initially at its normal pool or spillway elevation of 1285 feet (MSL), with the spillway weir discharging freely. The outlet conduit was assumed to be non-functional for the purpose of analysis, since the flow capacity of the conduit is not such that it would significantly increase the total discharge capabilities of the facility. The spillway is a rectangular masonry channel with discharges controlled by a concrete ogee-like weir. All pertinent engineering calculations relative to the evaluation of this facility are provided in Appendix D.

Overtopping analysis (using the Modified HEC-1 Computer Program) indicated that the discharge/storage capacity of Poe Dam can accommodate only about 75 percent of the PMF (SDF) prior to embankment overtopping. The peak PMF inflow of approximately 6283 cfs was essentially not attenuated by the discharge/storage capabilities of the dam, as the resulting PMF peak outflow was about 6272 cfs (see Appendix D, Summary Input/Output Sheets, Sheets B and C). Under the PMF, the embankment would be overtopped for approximately 5.8 hours with a maximum depth of inundation equal to about 1.2 feet above the low top of dam at elevation 1293.8 feet (Summary Input/Output Sheets, Sheet C).

5.6 Spillway Adequacy

Although Poe Dam cannot accommodate its SDF (the PMF), the possible downstream consequences of embankment failure due to overtopping were not evaluated. Since the facility can safely pass a flood of at least 1/2 PMF magnitude, breaching analysis was not performed, in accordance with Corps directive ETL-1110-2-234. Thus, as Poe Dam cannot accomodate a PMF-size flood, its spillway is considered to be inadequate, but not seriously inadequate.

SECTION 6
EVALUATION OF STRUCTURAL INTEGRITY

6.1 Visual Observations.

a. Embankment. Based on visual observations, the embankment is in excellent condition. Seepage observed beyond the downstream embankment toe is considered minor at this time. Nevertheless, the condition should be specifically addressed in future inspections.

b. Appurtenant Structures.

1. Spillway. The spillway is considered to be in excellent condition.

2. Outlet Conduit. The condition of the outlet conduit is considered fair due to the cracking observed along the masonry headwall and the corrosion at the discharge end of the conduit. The extent of corrosion and its effect on the integrity of the outlet conduit should be assessed and remedial measures taken if necessary.

6.2 Design and Construction Techniques.

No design data are available for review. Available correspondence and photographs indicate the owner's awareness and concern for adequate construction materials and techniques.

6.3 Past Performance.

No formal records of past performance are available; however, information contained in PennDER files generally reports good overall performance of the facility.

The greatest flood of record occurred in June 1972. At that time, the facility functioned adequately and sustained no significant damage. During this storm, however, flow under excess hydrostatic pressure was reportedly observed to the right of, and near the exit of the outlet conduit. Park personnel also stated that flow in this area has been observed subsequently on several occasions. As available correspondence does not sufficiently address the observed condition, it is recommended that this condition be further evaluated.

6.4 Seismic Stability.

The dam is located in Seismic Zone No. 1 and is subject to minor earthquake induced dynamic forces. As the facility appears well constructed and sufficiently stable, it is believed that it can withstand the expected dynamic forces; however, no calculations and/or investigations were performed to confirm this opinion.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS FOR REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety. The visual inspection suggests that the facility is in good condition.

The size classification of the facility is small and the hazard classification is considered to be high. In accordance with the recommended guidelines, the Spillway Design Flood (SDF) ranges between the 1/2 PMF (Probable Maximum Flood) and the PMF. Due to the high potential for damage to downstream structures and possibly loss of life, the SDF is considered to be the PMF. Results of the hydrologic and hydraulic analysis indicate the facility will pass and/or store approximately 75 percent of the PMF prior to embankment overtopping. As a result, the spillway is deemed inadequate, but not seriously inadequate.

Deficiencies noted by the inspection team included a small area of seepage located about 150 feet downstream of the embankment toe and 150 feet to the right of the spillway, a corroded outlet conduit and minor cracking of the masonry headwall at the discharge end of the conduit. Available correspondence also indicates that flow under excess hydrostatic pressure has been observed, at times, to the right of the outlet conduit exit.

b. Adequacy of Information. The available data is considered sufficient to make a reasonable Phase I assessment of the facility.

c. Urgency. The recommendations listed below should be implemented as soon as possible.

d. Necessity for Additional Investigations. It is recommended that the owner investigate and/or evaluate the reported flows occasionally observed to the right of, and near the outlet conduit headwall.

7.2 Recommendations/Remedial Measures.

It is recommended that the owner immediately:

a. Retain the services of a registered professinal engineer experienced in the design and construction of earth embankments to evaluate the seepage reportedly observed on occasion to the right of, and near the outlet conduit headwall.

b. Assess the extent of corrosion of the corrugated metal pipe outlet conduit and implement measures to repair the condition, if necessary.

c. Continue to observe the seepage emanating about 150 feet downstream of the embankment toe in future inspections and specifically note any changes in turbidity or flow rate.

d. Develop a formal operation and maintenance manual to ensure the continued proper care of the facility. Included in the manual should be a formal emergency warning system with provisions for around-the-clock surveillance of the facility during periods of unusually heavy precipitation. It is noted that some provisions for warning downstream inhabitants in the event of an embankment emergency have already been developed. The plan should be formally submitted to the PennDER, Division of Dam Safety, for approval or revision.

APPENDIX A

VISUAL INSPECTION CHECKLIST AND FIELD SKETCHES

CHECK LIST
VISUAL INSPECTION
PHASE 1

NAME OF DAM Poe Dam STATE Pennsylvania COUNTY Centre

NDI # PA — 00471 PENNDER # 14-105

TYPE OF DAM Earth SIZE Small HAZARD CATEGORY High

DATE(S) INSPECTION 29 November 79 WEATHER Ptly Cloudy TEMPERATURE 30° @ 10:00 a.m.

POOL ELEVATION AT TIME OF INSPECTION 1285.2 M.S.L.

TAILWATER AT TIME OF INSPECTION - M.S.L.

INSPECTION PERSONNEL	OWNER REPRESENTATIVES	*OTHERS*
B. M. Mihalcin	G. F. Resides (Park Superintendent)	
D. J. Spaeder	J. Stiehler (Park Ground Foreman)	
D. L. Bonk		

RECORDED BY B. M. Mihalcin

EMBANKMENT

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 00471
SURFACE CRACKS	None observed.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None observed.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Horizontal - Good. Vertical - Good.
RIPRAP FAILURES	None. Hand-placed durable sandstone riprap in excellent condition.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Good condition.

EMBANKMENT

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 00471
DAMP AREAS IRREGULAR VEGETATION (LUSH OR DEAD PLANTS)	None observed.
ANY NOTICEABLE SEEPAGE	One seep (≈ 1 cfs) observed emanating from ground surface about 150 feet downstream of embankment toe and 150 feet to right of spillway. Not serious. Probably related to fracturing in foundation rock surface.
STAFF GAGE AND RECORDER	None observed on day of inspection. New staff gage is reportedly on order.
DRAINS	No toe drains observed. Dam appears to be constructed with rock toe.

OUTLET WORKS

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 00471
INTAKE STRUCTURE	Concrete and masonry control tower structure in good condition. Masonry recently repointed. Accessible from crest by wooden footbridge.
OUTLET CONDUIT (CRACKING AND SPALLING OF CONCRETE SURFACES)	30-inch diameter C.M.P. Last 2 feet at discharge end are noticeably corroded near the flow line.
OUTLET STRUCTURE	Masonry headwall. Some cracking along left side.
OUTLET CHANNEL	30-foot long, trapezoidal-shaped, masonry-lined channel.
GATE(S) AND OPERATIONAL EQUIPMENT	Single valve or gate within control tower operated manually with crank from tower deck. Mechanism operated satisfactorily in the presence of the inspection team.

EMERGENCY SPILLWAY

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 00471
TYPE AND CONDITION	Rectangular masonry chute channel with concrete ogee-like weir crest. Excellent condition.
APPROACH CHANNEL	Masonry lined. Good condition.
SPILLWAY CHANNEL AND SIDEWALLS	Two-foot wide masonry wingwalls - excellent condition. Concrete end sill - good condition.
STILLING BASIN PLUNGE POOL	None.
DISCHARGE CHANNEL	Natural rock cut. Hard shale. High angle bedding planes - near vertical (≈70° to horizontal). Strike of bedding planes, diagonally across length of spillway.
BRIDGE AND PIERS EMERGENCY GATES	None.

SERVICE SPILLWAY

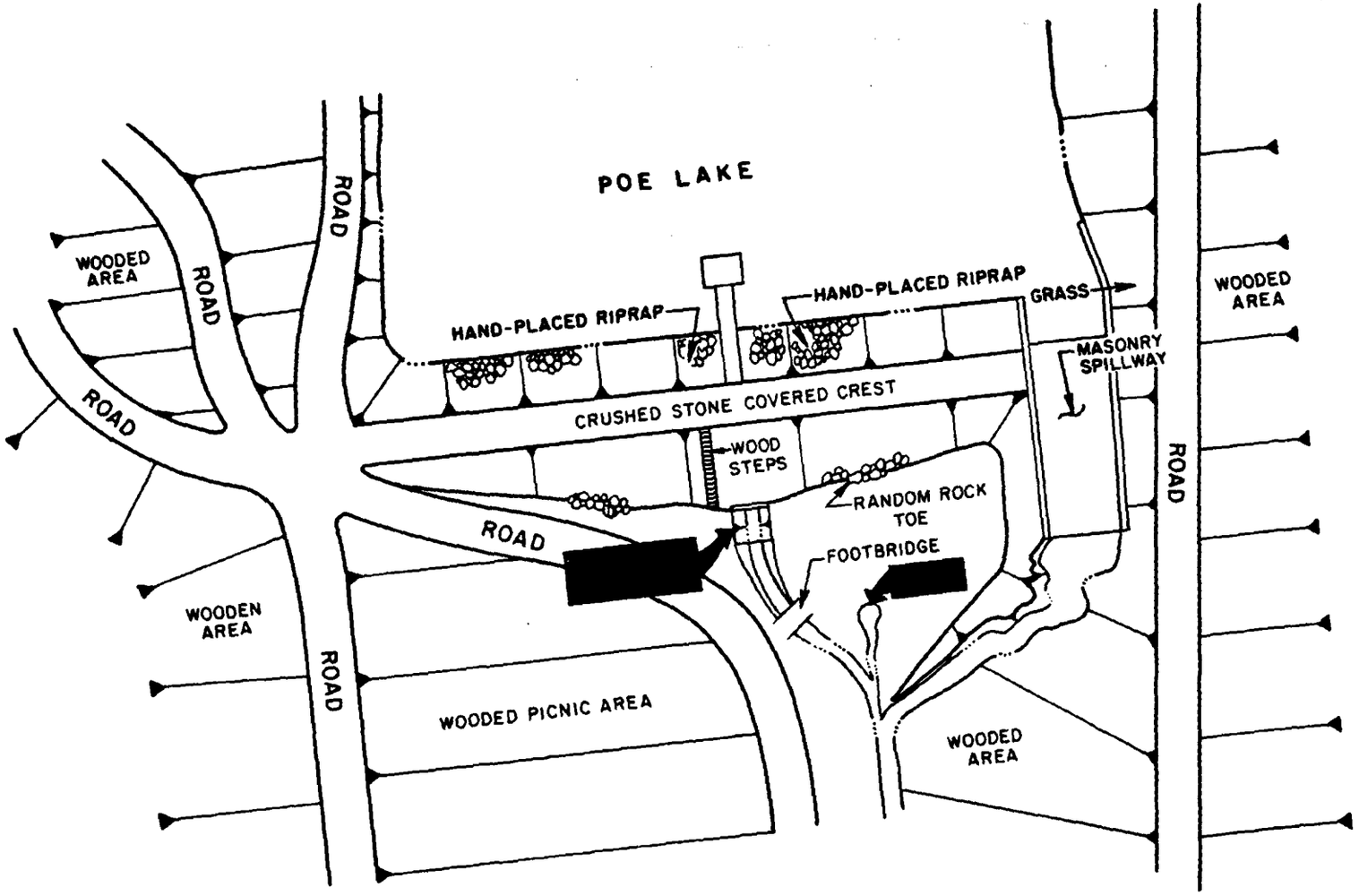
ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 00471
TYPE AND CONDITION	N/A
APPROACH CHANNEL	N/A
OUTLET STRUCTURE	N/A
DISCHARGE CHANNEL	N/A

INSTRUMENTATION

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 00471
MONUMENTATION SURVEYS	None.
OBSERVATION WELLS	None.
WEIRS	None.
PIEZOMETERS	None.
OTHERS	

RESERVOIR AREA AND DOWNSTREAM CHANNEL

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA- 00471
SLOPES: RESERVOIR	Steep and heavily wooded.
SEDIMENTATION	None observed.
DOWNSTREAM CHANNEL (OBSTRUCTIONS, DEBRIS, ETC.)	Big Poe Creek passes beneath 3 small concrete roadway bridges between the dam and Penns Creek.
SLOPES: CHANNEL VALLEY	Narrow, heavily forested valley with steep confining slopes.
APPROXIMATE NUMBER OF HOMES AND POPULATION	The valley downstream of Poe Dam contains several hunting cabins and a gun club lodge within the approximate 3-mile reach between the embankment and Penns Creek. At the confluence of Big Poe Creek and Penns Creek there is located a recreation and camping area known as Poe Paddy.
	Depending on the season, the population of the valley likely varies from zero to 20 or more persons.



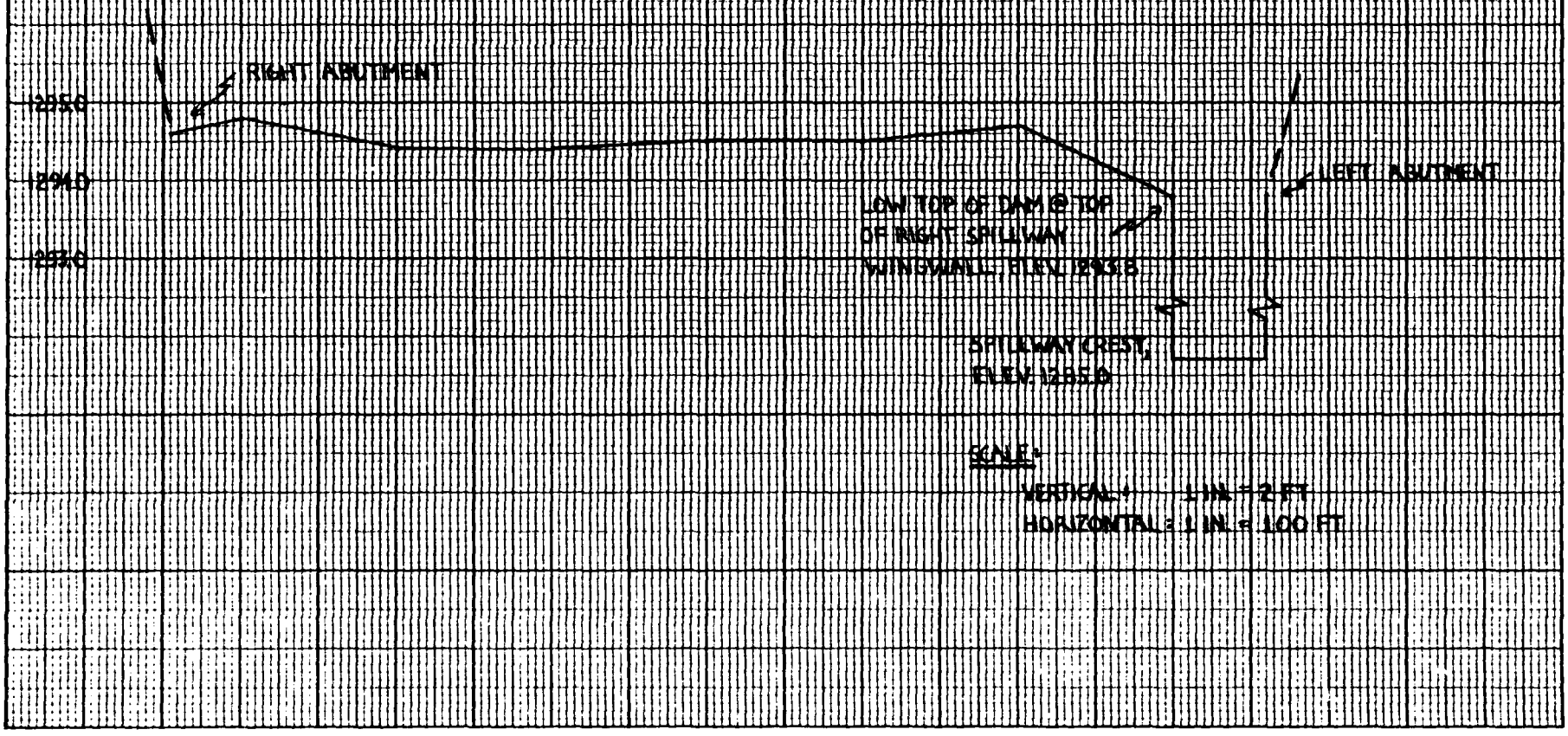
POE DAM

GENERAL PLAN – FIELD INSPECTION NOTES

POE DAM

PROFILE OF DAM CREST

FROM FIELD SURVEY



APPENDIX B

ENGINEERING DATA CHECKLIST

CHECK LIST
ENGINEERING DATA
PHASE I

NAME OF DAM POE DAM

ITEM	REMARKS NDI# PA. 00471
PERSONS INTERVIEWED AND TITLE	G. F. Resides - Park Superintendent J. Stiehler - Park Grounds Foreman
REGIONAL VICINITY MAP	See Figures 1 and 2, Appendix E.
CONSTRUCTION HISTORY	Constructed by Civilian Conservation Corps under the supervision of the Pennsylvania State Forest Service between the years 1935 and 1938. Construction photographs are contained in PennDER files.
AVAILABLE DRAWINGS	Set of 3 original design drawings are repeatedly referenced in corresondence contained in PennDER files dated 1936 through 1968. Drawings are now unavailable.
TYPICAL DAM SECTIONS	Not available.
OUTLETS: PLAN DETAILS DISCHARGE RATINGS	Not available.

CHECK LIST
ENGINEERING DATA
PHASE I
(CONTINUED)

ITEM	REMARKS	NDI# PA - 00471
SPILLWAY: PLAN SECTION DETAILS	Not available.	
OPERATING EQUIP- MENT PLANS AND DETAILS	Not available.	
DESIGN REPORTS	Not available.	
GEOLOGY REPORTS	Not available.	
DESIGN COMPUTATIONS: HYDROLOGY AND HYDRAULICS STABILITY ANALYSES SEEPAGE ANALYSES	Not available.	
MATERIAL INVESTIGATIONS: BORING RECORDS LABORATORY TESTING FIELD TESTING	Not available.	

CHECK LIST
ENGINEERING DATA
PHASE I
(CONTINUED)

ITEM	REMARKS	NDI# PA - 00471
BORROW SOURCES	Not known.	
POST CONSTRUCTION DAM SURVEYS	None.	
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	State inspection reports are prepared annually and are contained in PennDER files. Report entitled "Investigation of Seepage at Poe Valley State Park Dam" dated October 27, 1969 also contained in PennDER files.	
HIGH POOL RECORDS	Formal records are not available. Available correspondence indicates the flood of June 1972 resulted in about 4 feet of water discharging over the spillway weir.	
MONITORING SYSTEMS	A staff gage is on order for the facility; however, presently there are no formal plans to take regular readings.	
MODIFICATIONS	Gravel underdrains were installed in 1969 in the flat area downstream of the embankment between the spillway and outlet conduit in order to eliminate a marshy condition. No other modifications have been performed.	

CHECK LIST
ENGINEERING DATA
PHASE I
(CONTINUED)

ITEM	REMARKS NDI# PA-00471
PRIOR ACCIDENTS OR FAILURES	*None.*
MAINTENANCE: RECORDS MANUAL	Maintenance is performed seasonally or as-needed. Routine maintenance includes cutting grass, pointing masonry, replacing missing riprap, greasing valve stem. No formal manual available. Maintenance reports are prepared and filed.
OPERATION: RECORDS MANUAL	No formal manual. Operating records are not kept.
OPERATIONAL PROCEDURES	Facility is essentially self-regulating. Blowoff is opened annually to clear sediment and verify its operability.
WARNING SYSTEM AND/OR COMMUNICATION FACILITIES	Park Superintendent G. F. Resides has developed a brief written plan of action for use in the case of a flood emergency (see Section 4.4).
MISCELLANEOUS	Reservoir drawndown in 1979 between September and November to recover beach sand and repoint control tower masonry.

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CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

NDI ID # 00471
PENNDER ID # 14-105

SIZE OF DRAINAGE AREA: 4.9 square miles

ELEVATION TOP NORMAL POOL: 1285 STORAGE CAPACITY: 460 acre-feet

ELEVATION TOP FLOOD CONTROL POOL: - STORAGE CAPACITY: -

ELEVATION MAXIMUM DESIGN POOL: - STORAGE CAPACITY: -

ELEVATION TOP DAM: 1293.8 STORAGE CAPACITY: 740 acre-feet

SPILLWAY DATA

CREST ELEVATION: 1285 feet.

TYPE: Uncontrolled, masonry chute with ogee-like crest.

CREST LENGTH: 60 feet.

CHANNEL LENGTH: 132 feet.

SPILLOVER LOCATION: Left abutment.

NUMBER AND TYPE OF GATES: None

OUTLET WORKS

TYPE: 30-inch diameter C.M.P., encased in concrete.

LOCATION: approximate center of embankment.

ENTRANCE INVERTS: Not known.

EXIT INVERTS: 1260.4 feet (field measured).

EMERGENCY DRAWDOWN FACILITIES: 30-inch diameter gate valve near inlet end of outlet conduit.

HYDROMETEOROLOGICAL GAGES

TYPE: None.

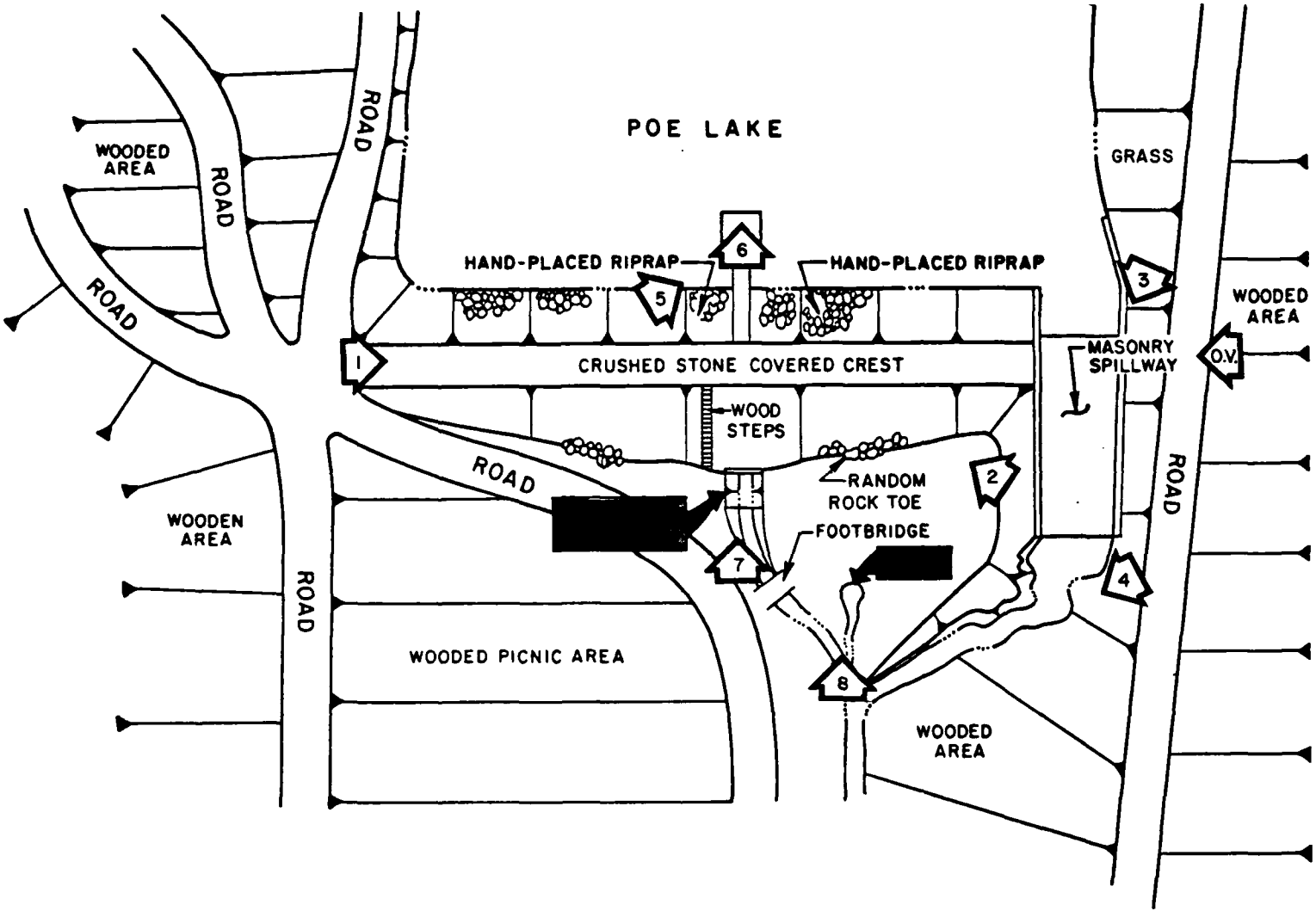
LOCATION: -

RECORDS: -

MAXIMUM NON-DAMAGING DISCHARGE: ≈ 1340 cfs (June 1972 - 4 feet over spillway weir).

APPENDIX C

PHOTOGRAPHS



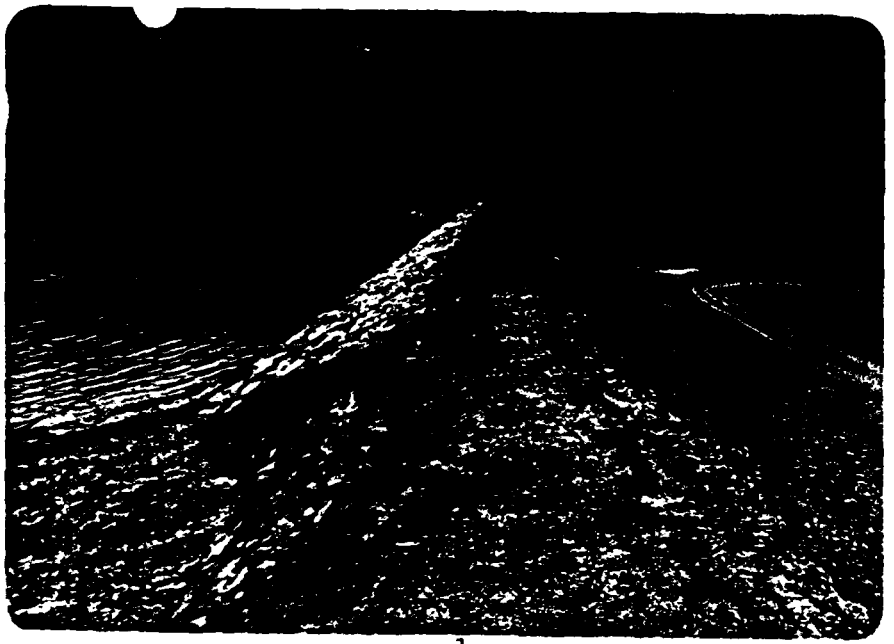
POE DAM
PHOTOGRAPH KEY MAP

PHOTOGRAPH 1 View of the embankment as seen from the crest at the right abutment.

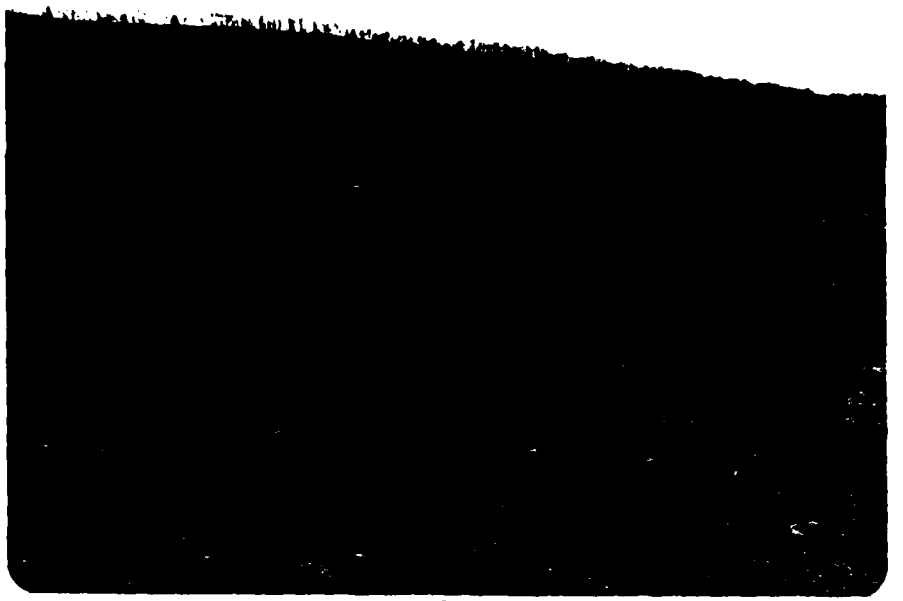
PHOTOGRAPH 2 View of the downstream embankment face as seen from the spillway right wingwall.

PHOTOGRAPH 3 View of the spillway looking downstream.

PHOTOGRAPH 4 View of the channel immediately below the spillway as seen from the left abutment.



1



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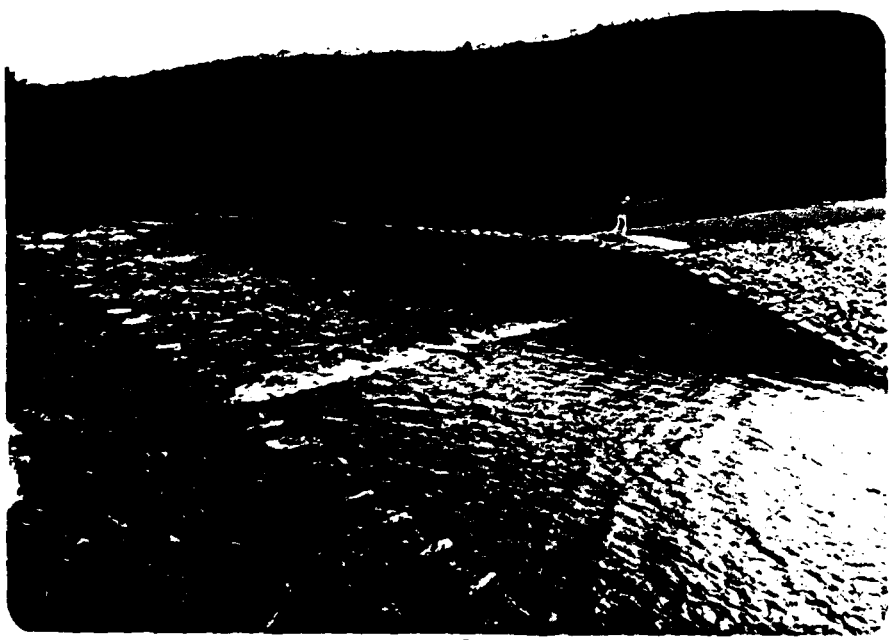

3

4

PHOTOGRAPH 5 View of the masonry control tower and upstream embankment face.

PHOTOGRAPH 6 View of the blowoff conduit valve control as seen from the deck of the control tower.

PHOTOGRAPH 7 View, looking upstream, of the discharge end of the outlet conduit.

PHOTOGRAPH 8 View of seepage located in a wooded area downstream of the embankment between the spillway and outlet conduit.

5

6

7

8

APPENDIX D

HYDROLOGY AND HYDRAULICS ANALYSES

PREFACE

The modified HEC-1 program is capable of performing two basic types of hydrologic analyses: 1) the evaluation of the overtopping potential of the dam; and 2) the estimation of the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. Briefly, the computational procedures typically used in the dam overtopping analysis are as follows:

a. Development of an inflow hydrograph(s) to the reservoir.

b. Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.

c. Routing of the outflow hydrograph(s) from the reservoir to desired downstream locations. The results provide the peak discharge(s), time(s) of the peak discharge(s), and the maximum stage(s) of each routed hydrograph at the downstream end of each reach.

The evaluation of the hydrologic-hydraulic consequences resulting from an assumed structural failure (breach) of the dam is typically performed as shown below.

a. Development of an inflow hydrograph(s) to the reservoir.

b. Routing of the inflow hydrograph(s) through the reservoir.

c. Development of a failure hydrograph(s) based on specified breach criteria and normal reservoir outflow.

d. Routing of the failure hydrograph(s) to desired downstream locations. The results provide estimates of the peak discharge(s), time(s) to peak and maximum water surface elevations of failure hydrographs for each location.

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: POE DAM

PROBABLE MAXIMUM PRECIPITATION (PMP) = 22.2 INCHES/24 HOURS (1)

STATION	1	2	3
STATION DESCRIPTION	POE DAM		
DRAINAGE AREA (SQUARE MILES)	4.9		
CUMULATIVE DRAINAGE AREA (SQUARE MILES)	-		
ADJUSTMENT OF PMF FOR DRAINAGE AREA LOCATION (%) (1)			
6 HOURS	120		
12 HOURS	130		
24 HOURS	139		
48 HOURS	146		
72 HOURS	149		
SNYDER HYDROGRAPH PARAMETERS			
ZONE (2)	18		
C_p (3)	0.50		
C_t (3)	2.10		
L (MILES) (4)	6.2		
L_{ca} (MILES) (4)	2.9		
$t_p = C_t (L \cdot L_{ca})^{0.3}$ (HOURS)	5.0		
SPILLWAY DATA			
CREST LENGTH (FEET)	60.0		
FREEBOARD (FEET)	8.8		

(1) HYDROMETEOROLOGICAL REPORT 40, U.S. WEATHER BUREAU, 1965.

(2) HYDROLOGIC ZONE DEFINED BY CORPS OF ENGINEERS, BALTIMORE DISTRICT, FOR DETERMINATION OF SNYDER COEFFICIENTS (C_p AND C_t).

(3) SNYDER COEFFICIENTS

(4) L = LENGTH OF LONGEST WATERCOURSE FROM DAM TO BASIN DIVIDE.
L_{ca} = LENGTH OF LONGEST WATERCOURSE FROM DAM TO POINT OPPOSITE BASIN CENTROID

PROJECT DAM SAFETY INSPECTION
POE DAM

BY DTS DATE 12-22-79 PROJ. NO. 79-227-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 1 OF 15

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DAM STATISTICS

- HEIGHT OF DAM = 33 FT (FIELD MEASUREMENT)
- NORMAL POOL STORAGE CAPACITY = 150 X 10⁶ GALLONS
  = 460 ACRE-FT (SEE NOTE 1)
- MAXIMUM POOL STORAGE CAPACITY = 740 ACRE-FT (SHEET 4)
  (AT LOW TOP OF DAM)
- DRAINAGE AREA = 4.9 SQUARE MILES (PLANIMETERED ON ... 7.5 MINUTE TOPO QUAD; COCKEN, AND SPRING MILLS, PA)
- ELEVATION OF TOP OF DAM (FIELD) = 1293.8
- NORMAL POOL ELEVATION = 1285 (SEE NOTE 2)
- UPSTREAM INLET INVERT ELEVATION — NOT KNOWN (SHEET 5)
- DOWNSTREAM OUTLET INVERT (FIELD) — 1260.4 (FIELD NOTES)
- STREAMBED AT DAM CENTERLINE —

NOTE 1: ESTIMATED FROM DAMS, RESERVOIRS AND NATURAL LAKES, NORTH ... RESOURCES BULLETIN NO. 5, COMMONWEALTH OF PA. DEPT. OF FORESTS AND WATERS, HARRISBURG, PA, 1970.

PROJECT DAM SAFETY INSPECTION
POE DAM

BY DJS DATE 12-14-79 PROJ. NO. 79-303-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 2 OF 15

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NOTE 2: NORMAL POOL ELEVATION ESTIMATED FROM USGS TOPO MAP, AS NO DRAWINGS CONTAINING DETAILS OF DAM WERE AVAILABLE.

DAM CLASSIFICATION

DAM SIZE : SMALL (REF 1, TABLE 1)

HAZARD CLASSIFICATION : HIGH (FIELD OBSERVATION)

REQUIRED SDF : ½ PMF to PMF (REF 1, TABLE 3)

HYDROGRAPH PARAMETERS

- LENGTH OF LONGEST WATERCOURSE : $L = 6.2$ MILES

- LENGTH OF LONGEST WATERCOURSE FROM DAM TO A POINT OPPOSITE BASIN CENTROID : $L_{CA} = 2.9$ MILES

{ MEASURED ON USGS QUAD SHEET AND SCALED MILES }

$C_t = 2.10$
$C_p = 1.50$

(SUPPLIED BY SDE, BASED ON DESIGN CURVES FOR REGION)

SNYDERS STANDARD LAG : $t_p = C_t (L \cdot L_{CA})^{0.3}$
$= 2.10 (6.2 \times 2.9)^{0.3}$
$= 5.0$ HOURS.

(NOTE: HYDROLOGIC VARIABLES USED HERE ARE DEFINED IN REFERENCE 2,

PROJECT DAM SAFETY INSPECTION
POE DAM

BY DJS DATE 12-19-79 PROJ. NO. 79-203-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 3 OF 15

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IN SECTION ENTITLED "SNYDER SYNTHETIC UNIT HYDROGRAPH".)

RESERVOIR SURFACE AREAS

- SURFACE AREA (SA) @ NORMAL POOL (ELEVATION 1285) = 23 ACRES.

  (FROM "REPORT RE SMALL DAMS," POE VALLEY DAM, MADE TO THE WATER SUPPLY COMMISSION OF PENNSYLVANIA, HARRISBURG, PA, MAY, 1935, FOUND IN PENNDER FILES.)

- SA @ ELEV 1300 = 53 ACRES.

  (PLANIMETERED ON USGS TOPO MAP: COBURN, AND SPRING MILLS, PA)

RESERVOIR VOLUMES

RESERVOIR VOLUMES ABOVE NORMAL POOL:

- BETWEEN NORMAL POOL ELEVATION AND ELEVATION 1300, IT IS ASSUMED THAT THE MODIFIED PRISMOIDAL RELATIONSHIP ADEQUATELY MODELS THE RESERVOIR SURFACE AREA – STORAGE RELATIONSHIP. (POE 14, p. 15)

$$\Delta V_{1-2} = \frac{h}{3}\left(A_1 + A_2 + \sqrt{A_1 \cdot A_2}\right)$$

WHERE ΔV_{1-2} = INCREMENTAL VOLUME BETWEEN ELEVATIONS 1 & 2, IN ACRE-FT,

h = ELEVATION 1 – ELEVATION 2, IN FEET

A_1 = SURFACE AREA AT ELEVATION 1, IN ACRES

A_2 = SURFACE AREA AT ELEVATION 2, IN ACRES

JECT DAM SAFETY INSPECTION
POE DAM

BY JJS DATE 12-19-79 PROJ. NO. 79-203-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 4 OF 15

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ALSO, $A_i = A_o + \left(\frac{\Delta SA}{\Delta H} \times H\right)$

WHERE A_i = S.A. @ ELEV i, IN FEET
A_o = S.A @ NORMAL POOL (ELEV 1285.0)

$\frac{\Delta SA}{\Delta H}$ = RATE OF RESERVOIR AREA INCREASE PER FOOT RISE OF WATER LEVEL

→ BELOW ELEVATION 1300.0, $\frac{\Delta SA}{\Delta H} = \frac{53-23}{15} = \underline{2.0}$ AC-FT/FT

→ H = ELEV i − 1285.0

ELEVATION - STORAGE RELATIONSHIP ABOVE NORMAL POOL:

	ELEVATION (FT)	A_i (AC)	ΔV_{i-2} (AC-FT)	TOTAL VOLUME (AC-FT)
	1285.0	23.0	460*	460
	1286.0	25.0	24.0	484
	1287.0	27.0	26.0	510
	1288.0	29.0	28.0	538
	1289.0	31.0	30.0	568
	1290.0	33.0	32.0	600
	1291.0	35.0	34.0	634
	1292.0	37.0	36.0	670
	1293.0	39.0	38.0	708
(LOW TOP OF DAM)	1293.8	40.6	31.8	740
	1294.0	41.0	8.2	748
	1295.0	43.0	42.0	790
	1296.0	45.0	44.0	834
	1297.0	47.0	46.0	880
	1298.0	49.0	48.0	928
	1299.0	51.0	50.0	978
	1300.0	53.0	53.0	1030

* FROM SHEET 1

SUBJECT Dam Safety Inspection
Poe Dam

BY DJS DATE 12-20-79 PROJ. NO. 79-302-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 5 OF 15

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RESERVOIR ELEVATION AT ZERO STORAGE :

THE REPORTED MAXIMUM DEPTH OF STORED WATER IS 20 FEET, THEREFORE THE ZERO STORAGE ELEVATION IS APPROXIMATELY 1365.0 FEET.

(OBTAINED FROM "PRELIMINARY REPORT OF DAM PROPOSED FOR CONSTRUCTION," POE VALLEY DAM, SEPT. 11, 1935, FOUND IN PENN DER FILES.)

- FOR STORAGE VALUES BELOW NORMAL POOL ELEVATION, THE MODIFIED PRISMOIDAL RELATIONSHIP WILL AGAIN BE USED. A CORRECTION FACTOR WILL BE USED SINCE THE VOLUME AT NORMAL POOL IS KNOWN.

$$\frac{\Delta SA}{\Delta H} = \frac{23-0}{20} = 1.15 \text{ AC-FT/FT.}$$

ELEVATION - STORAGE RELATIONSHIP BELOW NORMAL POOL :

ELEVATION (FT)	A_i (AC)	ΔV_{1-3} (AC-FT)	INITIAL COMPUTED VOLUME (AC-FT)	CORRECTED VOLUME * (AC-FT)
1365.0	0	—	0	0
1370.0	5.75	9.6	9.6	20
1375.0	11.5	42.3	51.9	107
1380.0	17.25	71.4	123.3	254
1385.0	23.0	100.3	223.6	460

* CORRECTED VOLUME = $\left(\frac{\text{ACTUAL VOLUME @ NORMAL POOL}}{\text{COMPUTED VOL. @ NORMAL POOL}}\right) \times$ (INITIAL COMPUTED VOLUME)

$= \frac{460}{223.6} \times$ INITIAL COMPUTED VOLUME

JECT DAM SAFETY INSPECTION
FOX DAM

BY DJS DATE 12-22-79 PROJ. NO. 79-363-471
CHKD. BY DLB DATE 12-21-79 SHEET NO. 6 OF 15

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PMP CALCULATIONS

- FROM REFERENCE 9, FIGURE 2, OBTAIN PMP VALUE FOR A BASIN OF DRAINAGE AREA 200 SQUARE MILES, FOR A DURATION OF 24 HRS:

PRECIP = 22.2 INCHES

- FROM REF. 9, FIGURE 1, THE GEOGRAPHIC ADJUSTMENT FACTOR = 132.5 %

- AREA CORRECTION FACTOR (REF. 9):

DURATION (HRS):	6	12	24	48	72
FACTOR (%):	117.5	127.0	136.0	142.5	145.0

- TOTAL CORRECTION FACTOR (1.025 x AREA CORRECTION FACTOR):

DURATION (HRS):	6	12	24	48	72
FACTOR (%):	120	130	139	146	149

- H&H EROSK FACTOR (ADJUSTMENT FOR BASIN SHAPE AND FOR THE LESSER LIKELIHOOD OF A SEVERE STORM CENTERING OVER A SMALL BASIN) FOR A DRAINAGE AREA OF 4.2 SQUARE MILES IS 2.33.

(REF 4, P. 75)

PROJECT DAM SAFETY INSPECTION
POE DAM

BY DJS DATE 12-17-79 PROJ. NO. 79-203-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 7 OF 15

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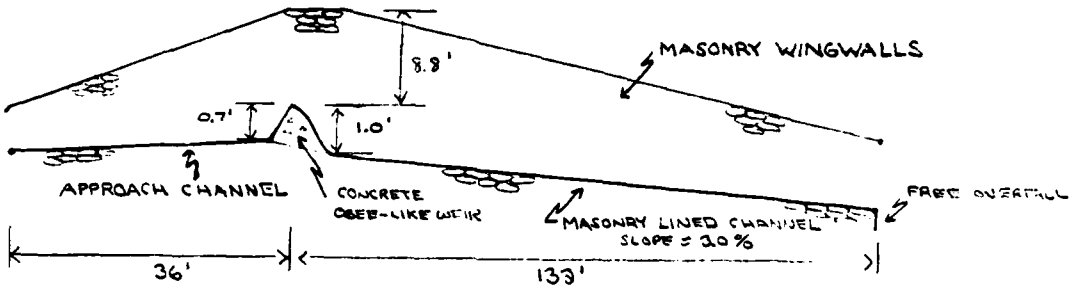
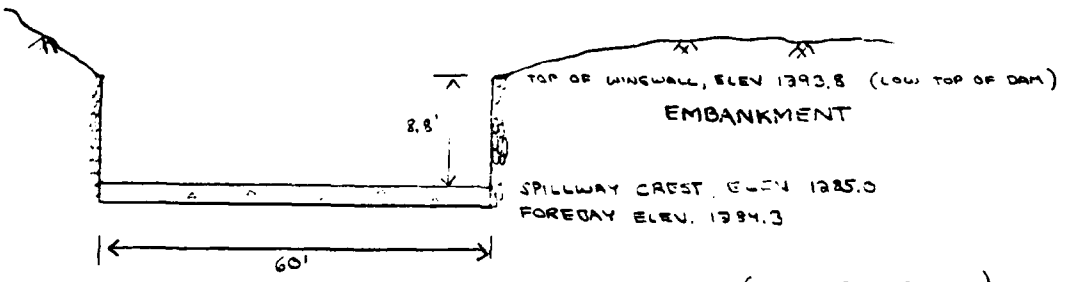
SPILLWAY CAPACITY

PROFILE OF SPILLWAY :



(NOT TO SCALE)

CROSS-SECTION OF SPILLWAY :



(NOT TO SCALE)

— SECTION LOOKING DOWNSTREAM —

(BASED ON FIELD NOTES)

- THE SPILLWAY CONSISTS OF A MASONRY LINED RECTANGULAR CHANNEL WITH DISCHARGES CONTROLLED BY A CONCRETE OGEE-LIKE WEIR.

JECT DAM SAFETY INSPECTION
POE DAM

BY DJS DATE 12-18-79 PROJ. NO. 79-203-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 8 OF 15

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CAPACITY OF SPILLWAY:

DISCHARGE OVER THE OGEE-LIKE WEIR CAN BE ESTIMATED BY THE RELATION

$$Q = CLH^{3/2} \qquad \text{(REF 4, p. 373)}$$

WHERE

Q = DISCHARGE OVER THE WEIR (CFS)
C = DISCHARGE COEFFICIENT
L = LENGTH OF WEIR CREST = 60 FT
H = TOTAL HEAD ON CREST (FT)

- THE DESIGN HEAD IS ASSUMED TO BE AT THE TOP OF THE SPILLWAY, OR 8.3 FEET. IT WILL BE ASSUMED THAT THE RELATIONSHIPS IN REFERENCE 4, PAGES 378-382, ARE APPLICABLE TO THIS OGEE-LIKE WEIR. FOR A FORECAST DEPTH OF 2.7 FEET,

$$\frac{P}{H_o} = \frac{2.7}{8.3} = 0.08$$

$$\therefore C_o = 3.35 \qquad \text{(REF 4, Fig 377, p. 377)}$$

- ASSUME SLOPE OF U.S. FACE OF WEIR = 1:1

$$\therefore \frac{C_{inclined}}{C_{vertical}} = 1.04$$

$$\therefore C = (1.04)(3.35) = 3.48$$

- APPROACH CHANNEL AND DESIGN FLOW:

- APPROACH CHANNEL LENGTH = 36 FT (FIELD MEASUREMENT)

JECT DAM SAFETY INSPECTION
POE DAM

BY DJS DATE 12-18-79 PROJ. NO. 79-203-471

CHKD. BY DCB DATE 12-21-79 SHEET NO. 9 OF 15

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- ASSUME AVERAGE APPROACH CHANNEL WIDTH ≈ 60 FT

- AT ELEV. 1293.8 (DESIGN POOL),
AVERAGE APPROACH CHANNEL DEPTH ≈ 8.8+0.7 ≈ 9.5 FT

- FLOW AREA ≈ 9.5 x 60 ≈ 570 FT²

- INITIAL ESTIMATE OF DISCHARGE:

$$Q = CLH^{3/2} = (3.48)(60)(8.8)^{1.5} \approx 5450 \text{ CFS}$$

- AVERAGE VELOCITY IN APPROACH CHANNEL

$$V_a = Q/A = 5450/570 = 9.6 \text{ FPS}$$

- AVERAGE APPROACH VELOCITY HEAD

$$h_a = \frac{V_a^2}{2g} = \frac{9.6^2}{64.4} \approx 1.43 \text{ FT}$$

- ASSUMING THAT THE APPROACH CHANNEL ENTRANCE LOSS = 0.1 h_a,
(REF 4, p. 379),
ENTRANCE LOSS = 0.1 x 1.43 = 0.14 FT

- APPROACH CHANNEL FRICTION LOSS, h_F:

$$h_F = \left[\frac{V_a n}{1.486 R^{2/3}}\right]^2 \times L_c$$

WHERE L_c = LENGTH OF APPROACH CHANNEL = 36 FT
n = MANNING'S ROUGHNESS COEFFICIENT = 0.035
(COMPUTED, FIELD OBSERVATION)
R = HYDRAULIC RADIUS = FLOW AREA / WETTED PERIMETER

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WETTED PERIMETER:

RIGHT WINGWALL:

VARIES IN HEIGHT FROM 2 TO 2.5, AVG = 4.8 FT

LEFT WINGWALL:

VARIES IN HEIGHT FROM ABOUT 2 TO 2.5, AVG = 5.8 FT

∴ AVG WETTED PERIMETER = 60 + 5.8 + 4.8 = 70.6 FT

∴ $R_{H\text{-}AVG} = \frac{570}{70.6} = 8.1$ FT

∴ $h_f = \left[\frac{(9.6)(0.035)}{(1.486)(8.1)^{2/3}}\right]^2 \times 36 = 0.11$ FT

∴ TOTAL APPROACH CHANNEL LOSS = 0.11 + 0.14 = 0.25 FT

- ACTUAL EFFECTIVE HEAD H_E = 8.8 − 0.25 = 8.55 FT

SPILLWAY CAPACITY = $(3.48)(60)(8.55)^{1.5}$ = 5800 CFS

- FOR HEADS OTHER THAN DESIGN HEAD, THE APPROACH CHANNEL LOSSES WILL BE ASSUMED TO BE PROPORTIONAL TO THE LOSSES AT DESIGN HEAD:

$$h_L = \left(\frac{0.25}{8.80}\right) H$$

WHERE h_L = APPROACH CHANNEL LOSS

H = RESERVOIR ELEVATION − 1975.0

EFFECT OF DOWNSTREAM APRON INTERFERENCE:

BECAUSE OF THE POSITION OF THE APRON FLOOR IN RELATION TO THE CREST OF THE WEIR THERE WILL MOST LIKELY BE NO DRAG

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INTERFERENCE, THUS REDUCING THE DISCHARGE CAPACILITIES OF THE SPILLWAY. IT WILL BE ASSUMED THAT TAILWATER EFFECTS ARE NEGLIGIBLE, AND THUS THE ONLY DOWNSTREAM EFFECTS WILL BE DUE TO APRON INTERFERENCE.

— AT DESIGN POOL,

$$\frac{h_d + d}{He} \simeq \frac{9.55}{8.55} = \underline{1.12}$$

($h_d + d = He + 1.0$; SEE SHEET 7, AND FIG. 253, REF 4.)

FROM FIG 253, REF 4:

$$\frac{C_s}{C} \simeq 0.86$$

WHERE C_s = COEFFICIENT OF DISCHARGE CORRECTED FOR APRON EFFECTS
$C = 3.48$

$$C_s = (0.86)(3.48) = 2.99$$

∴ @ DESIGN HEAD $Q = (2.99)(50)(8.55)^{3/2} \simeq \underline{4485}$ CFS

EFFECT OF HEADS HIGHER THAN DESIGN HEAD:

AS THE HEAD ON THE WEIR BECOMES GREATER, DISCHARGE IS REDUCED DISPROPORTIONATELY, DUE TO THE ROUGHNESS AND THE CONTACT PRESSURE BETWEEN THE WATER AND THE WEIR. THUS, THE DISCHARGE COEFFICIENT (C) TAKES ON A LOWER VALUE THAN THAT OF DESIGN HEAD. THE OPPOSITE TREND OCCURS FOR HEADS GREATER THAN THAT OF DESIGN. THEREFORE THE DESIGN DISCHARGE COEFFICIENT MUST BE MODIFIED APPROPRIATELY, ACCORDING TO FIGURE 250, REF. 4.

PROJECT Dam Safety Inspection
Poe Dam

BY DJS DATE 12-17-79 PROJ. NO. 79-303-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 12 OF 15

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SPILLWAY RATING TABLE :

	RESERVOIR ELEVATION (FT)	H (FT)	① H/H_o	② C/C_o	③ C	④ ESTIMATED APPROACH LOSS : h_L (FT)	⑤ EFFECTIVE HEAD : He (FT)	⑥ $\frac{hd+d}{He}$	⑦ C_s/C	⑧ C_s	⑨ Q (CFS)
	1285.0	—	—	—	—	—		—	—		
	1286.0	1.0	0.11	2.32	2.85	0.03	0.97	2.03	1.00	2.85	160
	1287.0	2.0	0.23	0.86	2.99	0.06	1.94	1.52	0.78	2.33	480
	1288.0	3.0	0.34	0.89	3.10	0.09	2.91	1.34	0.95	2.95	850
	1289.0	4.0	0.45	0.91	3.17	0.11	3.89	1.26	0.92	2.92	1340
	1290.0	5.0	0.57	0.93	3.24	0.14	4.86	1.21	0.93	2.92	1850
	1291.0	6.0	0.68	0.95	3.31	0.17	5.83	1.17	0.88	2.91	2460
	1292.0	7.0	0.80	0.97	3.38	0.20	6.80	1.15	0.85	2.97	3160
	1293.0	8.0	0.91	0.99	3.45	0.23	7.77	1.13	0.87	3.00	3930
(LOW TOP OF DAM)	1293.8	8.8	1.00	1.00	3.48	0.25	8.55	1.12	0.86	2.99	4470
	1294.0	9.0	1.02	1.00	3.48	0.26	8.74	1.11	0.85	2.96	4570
	1295.0	10.0	1.14	1.02	3.55	0.28	9.72	1.10	0.85	3.02	5490
	1296.0	11.0	1.25	1.03	3.58	0.31	10.69	1.09	0.84	3.01	6310
	1297.0	12.0	1.36	1.04	3.62	0.34	11.66	1.09	0.84	3.04	7260
	1298.0	13.0	1.48	1.06	3.69	0.37	12.63	1.08	0.84	3.10	8350
	1299.0	14.0	1.59	1.07	3.72	0.40	13.60	1.07	0.83	3.09	9500
	1300.0	15.0	1.70	1.07	3.72	0.43	14.57	1.07	0.83	3.09	10,700
	1303.0	18.0	2.05	1.07	3.72	0.51	17.49	1.06	0.82	3.05	[illegible]

① H_o = Design Head = 8.8 FT

② C/C_o : From Ref 4, Fig 353, p. 378

③ C_o = 3.48 , $C = C/C_o \times 3.48$

④ $h_L = \left(\frac{0.25}{8.80}\right) H$ (See Sheet 13)

⑤ $He = H - h_L$

⑥ $(hd+d)/He = \frac{He+1.0}{He}$

⑦ From Fig 353, Ref 4, p 351

⑧ $C_s = (C_s/C) \times C$

⑨ $Q = C_s L He^{3/2}$, $L = 60$ FT

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EMBANKMENT RATING CURVE

– ASSUME THAT THE EMBANKMENT BEHAVES ESSENTIALLY AS A BROAD-CRESTED WEIR WHEN OVERTOPPING OCCURS. THUS, THE DISCHARGE CAN BE ESTIMATED BY THE RELATIONSHIP

$$Q = CLH^{3/2} \qquad \text{(REF 5, p. 5-23)}$$

WHERE

Q = DISCHARGE OVER EMBANKMENT (CFS)

L = LENGTH OF EMBANKMENT OVERTOPPED [illegible] (FT)

H = HEAD ON WEIR; IN THIS CASE IT IS THE AVERAGE "FLOW-AREA" WEIGHTED HEAD ABOVE THE CREST, USING THE LOW TOP OF DAM AS A DATUM. (FEET)

C = COEFFICIENT OF DISCHARGE, DEPENDENT ON THE [illegible] AND THE WEIR BREADTH.

LENGTH OF EMBANKMENT INUNDATED VS. RESERVOIR ELEVATION:

RESERVOIR ELEVATION (FT)	EMBANKMENT LENGTH (FT)
1993.8	0
1994.2	40
1994.5	300
1994.6	490
1994.8	630
1995.0	650
1996.0	660
1997.0	670
1998.0	680
[illegible]	690
[illegible]	700
[illegible]	730

(FROM FIELD MEASUREMENT, [illegible])

JECT DAM SAFETY INSPECTION
POE DAM

BY DJS DATE 12-19-79 PROJ. NO. 79-802-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 14 OF 15

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ASSUME THAT INCREMENTAL DISCHARGES OVER THE EMBANKMENT ARE APPROXIMATELY TRAPEZOIDAL IN CROSS-SECTIONAL FLOW AREA. THEN ANY INCREMENTAL AREA OF FLOW CAN BE ESTIMATED BY $H_i[(L_1+L_2)/2]$, WHERE L_1 = LENGTH AT LOWER ELEVATION, L_2 = LENGTH AT HIGHER ELEVATION, H_i = DIFFERENCE IN ELEVATIONS. THUS, THE TOTAL AVERAGE "FLOW-AREA" WEIGHTED HEAD, H_w, = (TOTAL FLOW AREA / L_2).

EMBANKMENT RATING TABLE:

RESERVOIR ELEV (FT)	L_1 (FT)	L_2 (FT)	INCREMENTAL HEAD, H_i (FT)	① INCREMENTAL FLOW AREA, A_i (FT^2)	TOTAL FLOW AREA, A_T (FT^2)	② WEIGHTED HEAD, H_w (FT)	③ H_w/L	④ C	⑤ Q (CFS)
1293.8	0	0	0	—	—	—	—	—	0
1294.2	0	40	0.4	8	8	0.2	0.01	2.77	10
1294.5	40	300	0.3	51	59	0.3	0.01	2.77	80
1294.6	300	490	0.1	40	99	0.2	0.01	2.77	130
1294.8	490	650	0.2	114	213	0.3	0.02	3.00	350
1295.0	650	650	0.2	130	343	0.5	0.03	3.02	610
1296.0	650	660	1.0	655	998	1.5	0.13	3.07	3670
1297.0	660	670	1.0	665	1663	2.5	0.17	3.06	5100
1298.0	670	680	1.0	675	2338	3.4	0.23	3.08	7300
1299.0	680	690	1.0	685	3023	4.4	0.29	3.09	[illegible]
1300.3	690	700	1.0	695	3718	5.3	0.35	3.09	[illegible]
1303.0	700	730	3.0	3145	5863	8.0	0.53	3.09	[illegible]

① $A_i = H_i\left(\frac{L_1+L_2}{2}\right)$

② $H_w = A_T / L_2$

③ L = BREADTH OF WEIR = 15 FT (FIELD MEASUREMENT)

④ $C = f(H, L)$; FROM REF. 13, FIG 24

⑤ $Q = CL_2 H_w^{3/2}$

JECT DAM SAFETY INSPECTIONS

POE DAM

BY DTS DATE 12-17-79 PROJ. NO. 79-303-471

CHKD. BY DLB DATE 12-21-79 SHEET NO. 15 OF 15

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TOTAL FACILITY RATING TABLE

$Q_{TOTAL} = Q_{SPILLWAY} + Q_{EMBANKMENT}$

(CFS)

	RESERVOIR ELEVATION	$Q_{SPILLWAY}$	$Q_{EMBANKMENT}$	Q_{TOTAL}
	1285.0	0		0
	1286.0	160		160
	1287.0	480		480
	1288.0	880		880
	1289.0	1340		1340
	1290.0	1880		1880
	1291.0	2460		2460
	1292.0	3160		3160
	1293.0	3900		3900
(LOW TOP OF DAM)	1293.8	4490	0	4490
	1294.2	4770 *	10	4780
	1294.5	5040 *	80	5120
	1294.6	5130 *	130	5260
	1294.8	5310 *	320	5630
	1295.0	5490	690	6180
	1296.0	6310	3690	10,000
	1297.0	7260	8100	15,360
	1298.0 *	8250	13,130	21,380
	1299.0	9300	19,680	28,980
	1300.0	10,310	26,390	36,700

* BY LINEAR INTERPOLATION.

SUMMARY INPUT / OUTPUT SHEETS

DAM SAFETY INSPECTION
FOE DAM ******* OVERTOPPING ANALYSIS ********
15-MINUTE TIME STEP AND 72-HOUR STORM DURATION

JOB SPECIFICATION

NMI	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
284	0	15	0	0	0	0	0	0	0

	JOPER	NWT	LROPT	TRACE
	5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1
RTIOS= .30 .40 .50 .60 .70 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW INTO RESERVOIR

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISMOM	ISAME	LOCAL
1	1	4.90	0.00	4.90	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PB5	R6	R12	R24	R48	R72	R96
0.00	22.20	120.00	130.00	139.00	146.00	149.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .600

INITIAL + CONSTANT RAINFALL LOSSES: C.O.E.

LOSS DATA

LROPT	STRKR	DLTKR	RTIOK	ERAIN	STRKS	RTIOR	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 5.00 CP= .50 NTA= 0

BASE FLOW PARAMETERS: C.O.E.

RECESSION DATA
STRTQ= -1.50 QRCSN= -.05 RTIOR= 2.00

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC=20.88 AND R=26.98 INTERVALS

UNIT HYDROGRAPH END-OF-PERIOD ORDINATES, LAG= 4.99 HOURS, CP= .50 VOL= .96

1.	13.	27.	44.	62.	83.	105.	126.	152.	177.
203.	228.	250.	269.	286.	301.	312.	321.	327.	329.
329.	326.	305.	294.	283.	273.	263.	253.	244.	235.
227.	218.	210.	203	195.	188	181.	175.	169.	163.
156.	151.	145.	140.	135.	130.	125.	121.	116.	112.
108.	104.	100.	97.	93.	90.	86.	83.	80.	77.
75.	72.	69.	67.	64.	62.	60.	58.	55.	53.
51.	50.	48.	46.	44.	43.	41.	40.	38.	37.
36.	34.	33.	32.	31.	30.	28.	27.	26.	25.
25.	24.	23.	22.	21.	20.	20.	19.	18.	18.

END-OF-PERIOD FLOW

0													
HO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	HO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	26.46	23.77	2.69	289890.
									(672.)(604.)(68.)(8208.77)				

DAM SAFETY INSPECTION
FOE DAM
OVERTOPPING

PROJECT ____ BY DTS DATE 12-28-79
CHKD. BY DLB DATE 12-28-79 PROJ. NO. 79-203-471
SHEET NO. A OF C

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SUBJECT DAM SAFETY INSPECTION

POE DAM

BY RJC DATE 8-22-79 PROJ. NO. 79-203-47

CHKD. BY DLB DATE 12-28-79 SHEET NO. B OF C

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INFLOWS INTO RESERVOIR

PMF

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6283.	5525.	2838.	1007.	269876.
CMS	178.	156.	80.	29.	8208.
INCHES		10.49	21.55	22.93	22.93
MM		266.41	547.38	582.41	582.41
AC-FT		2740.	5629.	5989.	5989.
THOUS CU M		3379.	6943.	7388.	7388.

0.7 PMF

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4398.	3867.	1987.	705.	202913.
CMS	125.	110.	56.	20.	5746.
INCHES		7.34	15.09	16.05	16.05
MM		186.49	383.17	407.69	407.69
AC-FT		1918.	3940.	4192.	4192.
THOUS CU M		2366.	4860.	5171.	5171.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE THROUGH RESERVOIR

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
101	1	0	0	0	0	1	0	0

ROUTING DATA

QDOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	460.	-1

STAGE	1285.00	1286.00	1287.00	1288.00	1289.00	1290.00	1291.00	1292.00	1293.00
	1294.20	1294.50	1294.60	1294.80	1295.00	1296.00	1297.00	1298.00	1299.00
FLOW	0.00	160.00	480.00	880.00	1340.00	1880.00	2460.00	3160.00	3900.00
	4780.00	5120.00	5260.00	5610.00	6180.00	10000.00	15360.00	21480.00	28960.00
CAPACITY=	0.	20.	107.	254.	460.	484.	510.	538.	568.	600.
	634.	670.	708.	748.	790.	834.	880.	928.	978.	1030.
ELEVATIONS=	1265.	1270.	1275.	1280.	1285.	1286.	1287.	1288.	1289.	1290.
	1291.	1292.	1293.	1294.	1295.	1296.	1297.	1298.	1299.	1300.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1285.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1294.8	0.0	0.0	0.

SUBJECT DAM SAFETY INSPECTION

POE DAM

BY BTS DATE 6-30-77 PROJ. NO. 79-203-471

CHKD. BY DLB DATE 12-28-79 SHEET NO. C OF C

RESERVOIR OUTFLOW HYDROGRAPHS

OVERTOPPING OCCURS @ ≈ 0.75 PMF

PEAK OUTFLOW IS 6272. AT TIME 44.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6272.	5461.	2833.	1005.	289451.
CMS	178.	155.	80.	28.	8196.
INCHES		10.37	21.52	22.90	22.90
MM		263.32	546.50	581.56	581.56
AC-FT		2708.	5620.	5980.	5980.
THOUS CU M		3340.	6932.	7377.	7377.

PMF

PEAK OUTFLOW IS 4300. AT TIME 45.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4300.	3620.	1983.	704.	202612.
CMS	122.	103.	56.	20.	5737.
INCHES		7.25	15.06	16.03	16.03
MM		184.21	382.42	407.08	407.08
AC-FT		1894.	3933.	4186.	4186.
THOUS CU M		2337.	4851.	5164.	5164.

0.7 PMF

SUMMARY OF DAM SAFETY ANALYSIS

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1285.00	1285.00	1293.80
STORAGE	460.	460.	740.
OUTFLOW	0.	0.	4490.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.30	1289.91	0.00	597.	1813.	0.00	45.25	0.00
.40	1290.97	0.00	653.	2445.	0.00	45.25	0.00
.50	1291.88	0.00	806.	3074.	0.00	45.00	0.00
.60	1292.72	0.00	697.	3691.	0.00	45.00	0.00
.70	1293.51	0.00	730.	4300.	0.00	45.00	0.00
BY INTERPOLATION → .75	1293.80	—	740.	4490.	—	—	—
1.00	1295.02	1.22	791.	6272.	5.75	44.50	0.00

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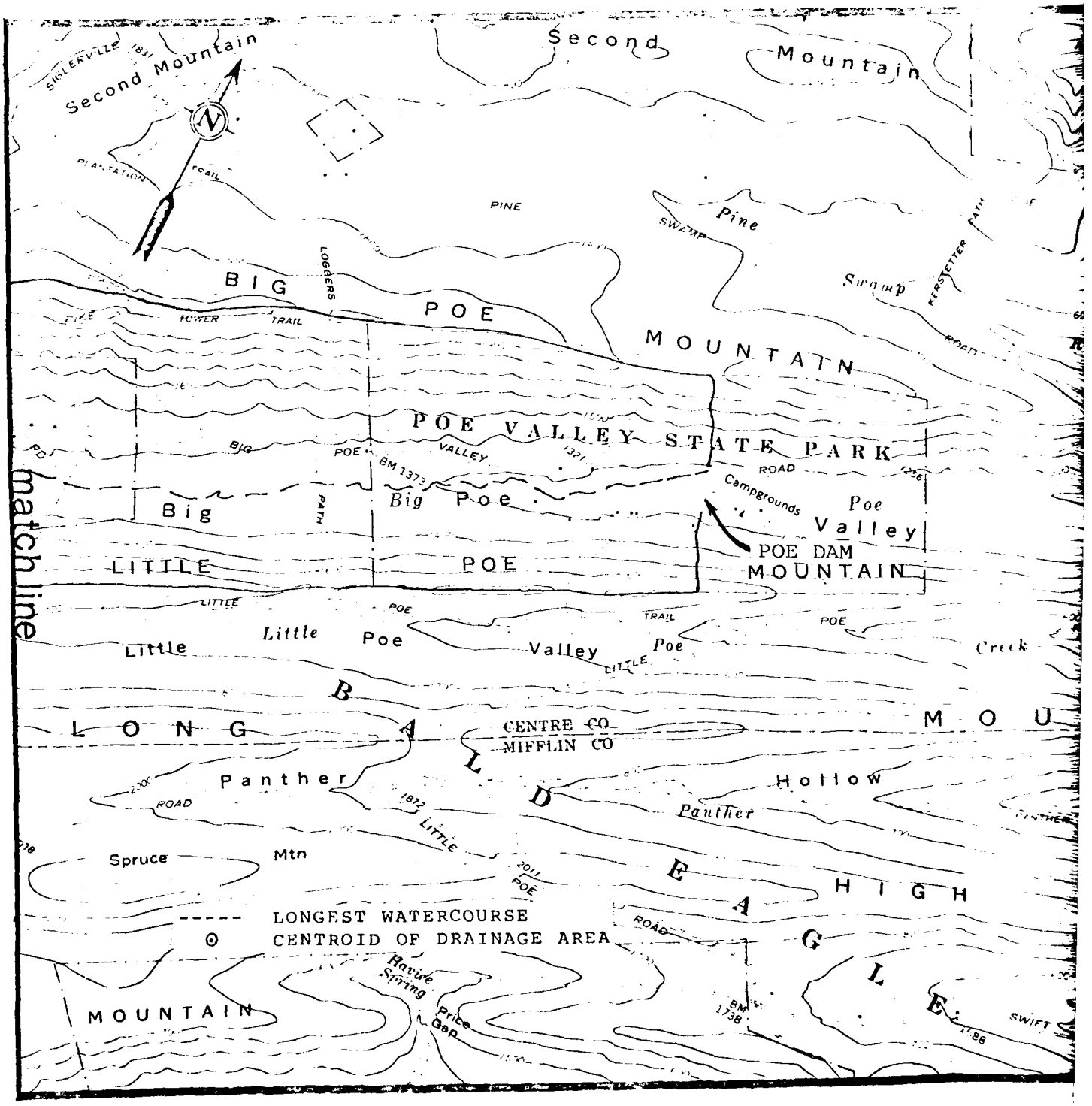
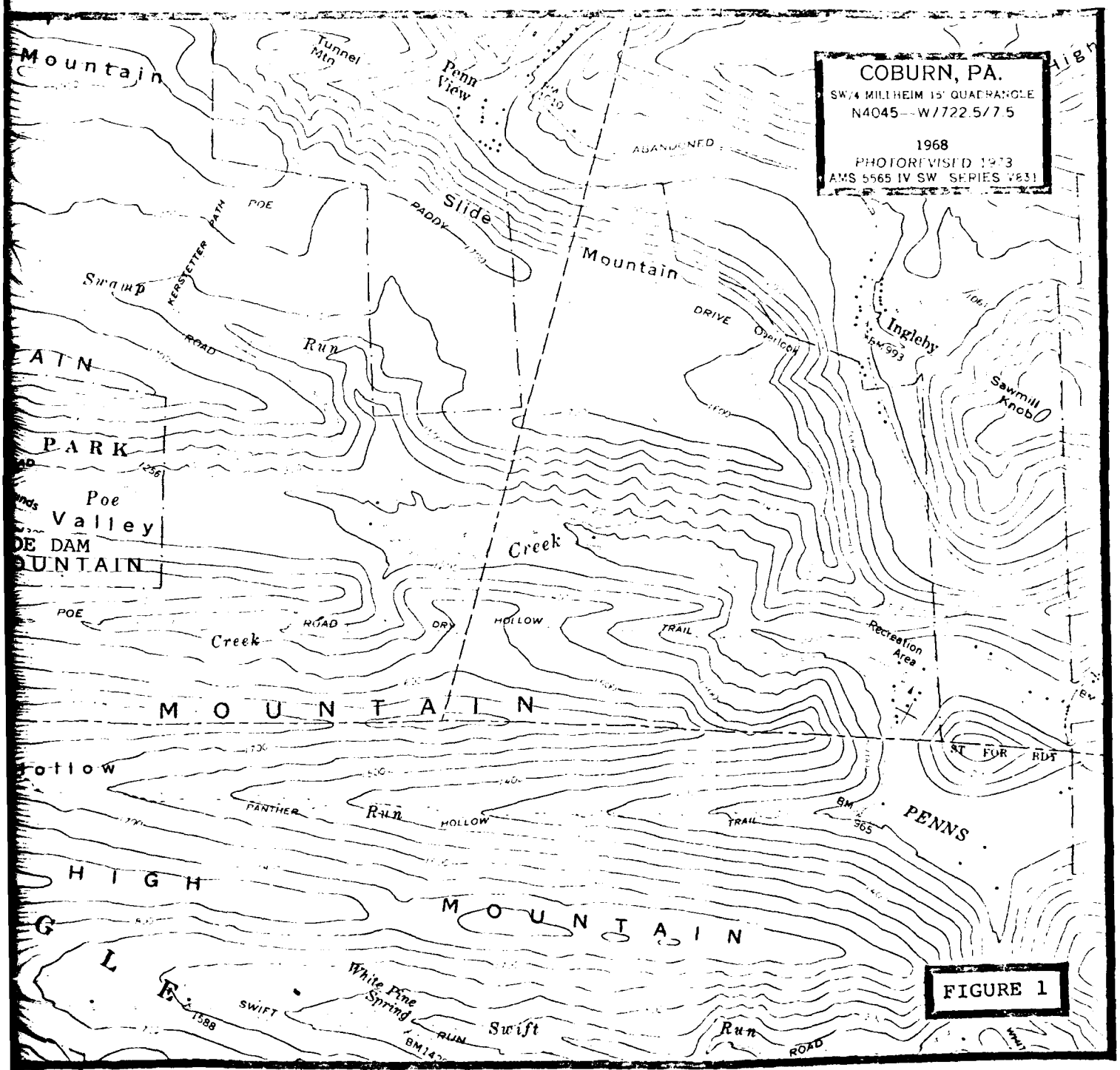
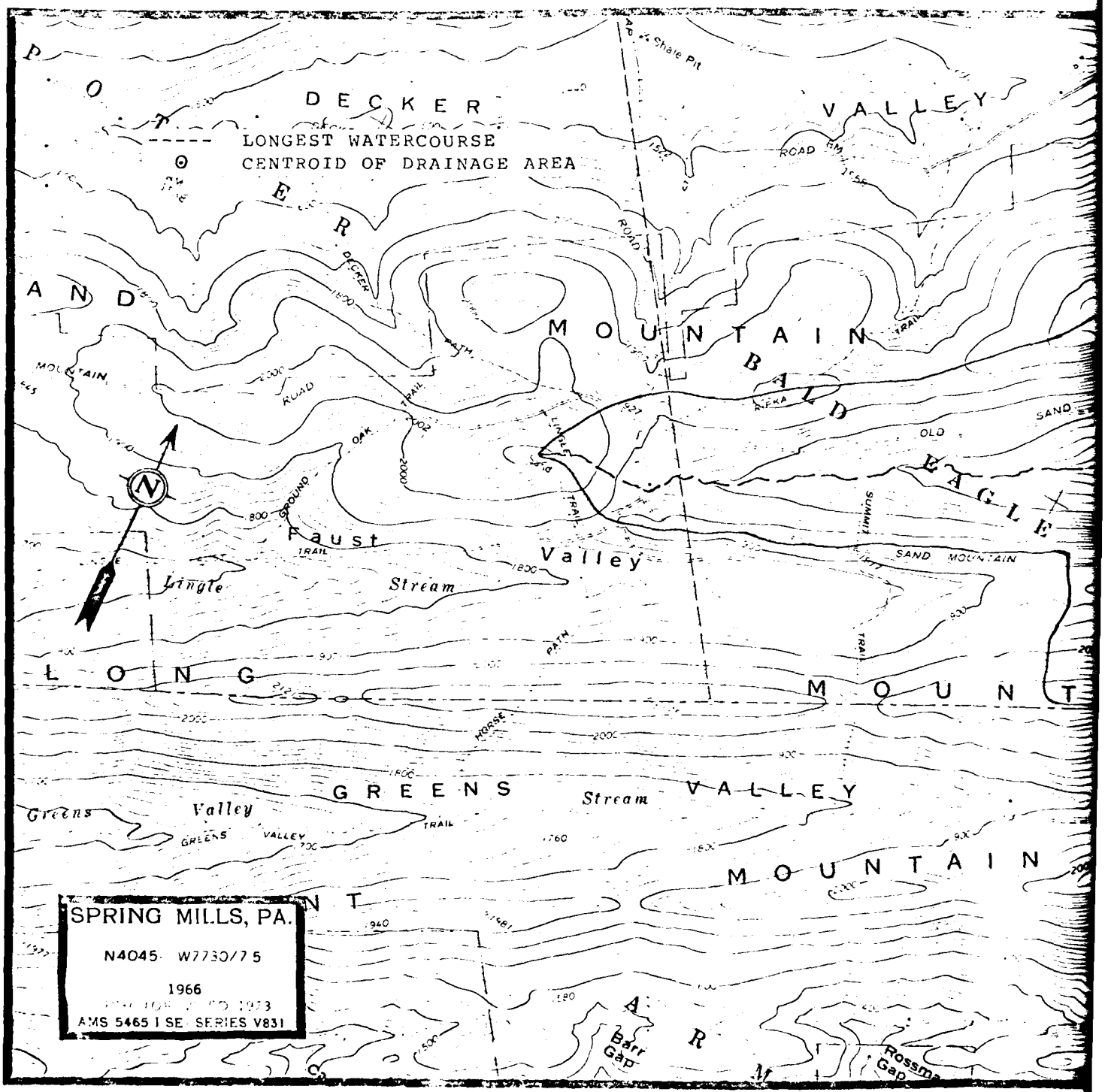
APPENDIX E

FIGURES

LIST OF FIGURES


Second Mountain
Second
Mountain
SIGLERVILLE 1831
PLANTATION
TRAIL
PINE
SWAMP
Pine
Swamp
KERSTETTER PATH
LOGGERS
BIG
POE
MOUNTAIN
FIRE
TOWER
TRAIL
ROAD
POE VALLEY STATE PARK
BIG
POE
VALLEY
BM 1373
1327
ROAD
Campgrounds
Big
PATH
Big Poe
Poe
Valley
POE DAM
MOUNTAIN
LITTLE
POE
match line
LITTLE
POE
TRAIL
POE
Little
Little Poe
Valley
Poe
Creek
LITTLE
L O N G
B A L D
CENTRE CO
MIFFLIN CO
M O U
Panther
Hollow
ROAD
1872
LITTLE
Panther
Spruce
Mtn
2011
POE
E A G L E
H I G H
LONGEST WATERCOURSE
CENTROID OF DRAINAGE AREA
ROAD
Havice
Spring
Price
Gap
MOUNTAIN
BM
1738
SWIFT
1188


COBURN, PA.
SW/4 MILLHEIM 15' QUADRANGLE
N4045—W/722.5/7.5
1968
PHOTOREVISED 1973
AMS 5565 IV SW SERIES V831
Mountain
Tunnel Mtn
Penn View
ABANDONED
Slide
Mountain
PATH
POE
KERSTETTER
PADDY
Swamp
ROAD
Run
DRIVE
Overlook
Ingleby
BM 993
Sawmill Knob
PARK
Poe
Valley
DAM
Creek
POE
ROAD
Creek
DRY
HOLLOW
TRAIL
Recreation Area
MOUNTAIN
ST FOR RDT
PANTHER
Run
HOLLOW
TRAIL
BM 965
PENNS
HIGH
MOUNTAIN
White Pine Spring
SWIFT
RUN
Swift
Run
ROAD
FIGURE 1


DECKER
VALLEY
LONGEST WATERCOURSE
CENTROID OF DRAINAGE AREA
Shale Pit
ROAD
DECKER
PATH
MOUNTAIN
BALD
EAGLE
SAND MOUNTAIN
OLD
SUMMIT
TRAIL
OAK
GROUND
Faust
Valley
Stream
Lingle
LONG
MOUNT
HORSE
GREENS
VALLEY
Stream
Greens
Valley
MOUNTAIN
Barr
Gap
Rossman
Gap
SPRING MILLS, PA.
N4045 W7730/7 5
1966
AMS 5465 I SE SERIES V831

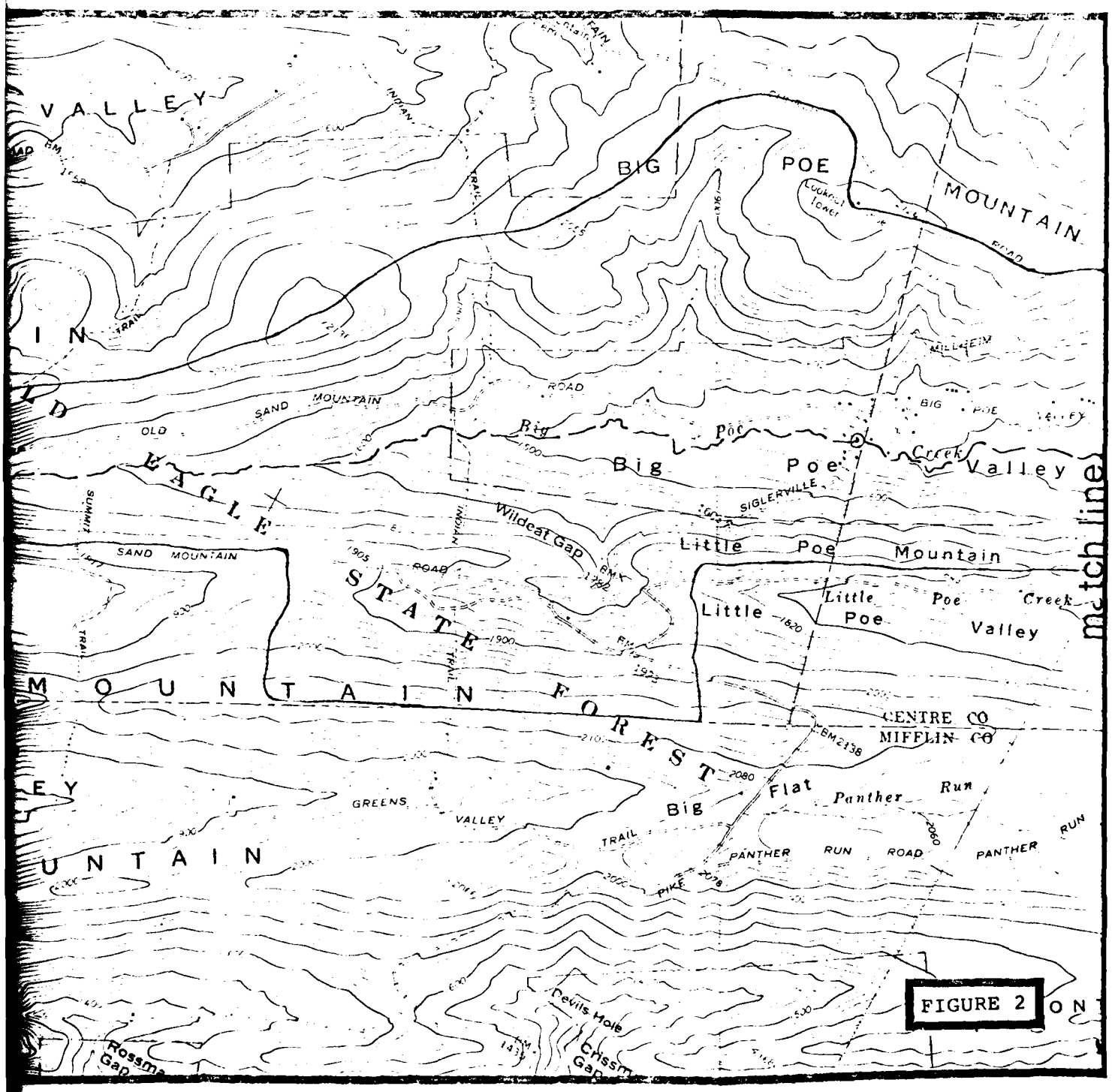

VALLEY
BIG
POE
MOUNTAIN
ROAD
SAND MOUNTAIN
OLD
Big Poe Creek Valley
Big Poe Creek Valley
SIGLERVILLE
Wildcat Gap
SAND MOUNTAIN
ROAD
STATE
Little Poe Mountain
Little Poe Creek Valley
Little Poe Valley
MOUNTAIN FOREST
CENTRE CO
MIFFLIN CO
GREENS VALLEY
Big Flat
Panther Run
TRAIL
PANTHER RUN ROAD
PANTHER RUN
PIKE
Devils Hole
Crissm Gap
Rossman Gap
match line

FIGURE 2

APPENDIX F

GEOLOGY

Geology

Poe Dam is located in the Appalachian Mountain Section of the Valley and Ridge physiographic province of central Pennsylvania. This region is characterized by a series of northeast-southwest trending parallel mountains and intermontane valleys. Intense lateral compression from the southeast produced a series of high amplitude anticlines and synclines in the formerly flat lying strata. Folding of the rock strata was followed by uplift. Subsequent erosion cut valleys in the soft nonresistant beds and left the hard resistant strata as high mountain ridges.

Poe Dam and reservoir is located in Big Poe Valley which is flanked on the northwest by Big Poe Mountain and on the southeast by Little Poe Mountain. Structurally, the axis of a small anticline passes along the length of the valley. The valley, therefore, is a breached anticlinal valley trending northeast-southwest with flanking strata dipping away from the valley centerline, i.e. to the northwest on the north flank and to the southeast on the south flank. The axial trace of the anticlinal structure appears to pass beneath the reservoir and dam.

Bedrock underlying the embankment consists of "hard black shale" which most likely represents the lower portion of the Reedsville Formation of Ordovician age. The bedding of the shale in the cut below the spillway was observed to strike N 70° E and dip approximately 44° NW. Bedding and cleavage planes are generally closely spaced; however, several joints of various attitudes were observed to be open.

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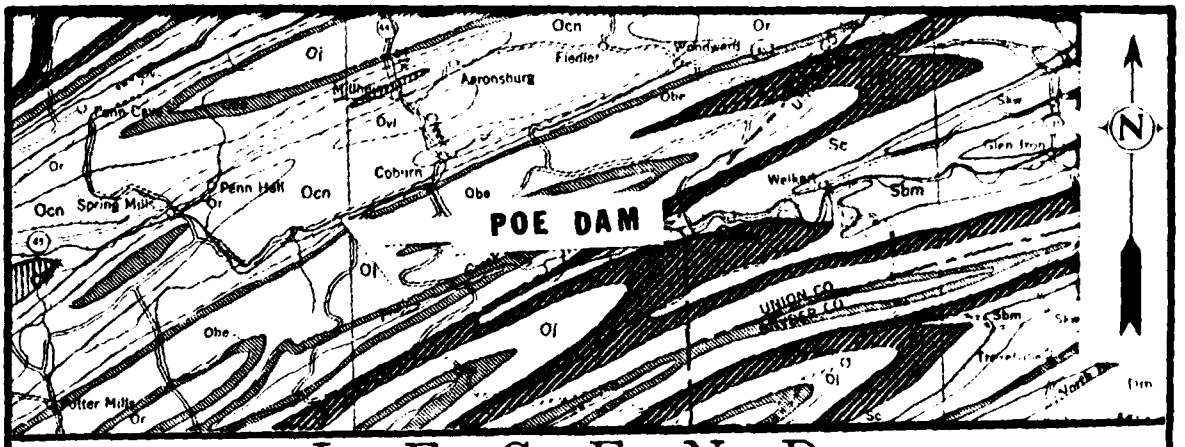
[1] Gray, C., et al., "Pennsylvania Geologic Map," Pennsylvania Geological Survey, Fourth Series, 1960.

[2] Lohman, Stanley W., Ground Water in South-Central Pennsylvania, Pennsylvania Geological Survey, Bulletin W5, 1938.

[3] "Investigation of Seepage at Poe Valley State Park Dam," PennDER correspondence, 1968 and 1969.



L E G E N D

SILURIAN

Keyser Formation
Dark gray, highly fossiliferous, thick bedded, crystalline to nodular limestone, passes into Mandata, Rondout, and Decker Formations in the east.

Skw

Tonoloway Formation
Gray, highly laminated, thin bedded, argillaceous limestone, passes into Bossardville and Pogano Island beds in the east

Wills Creek Formation
Greenish gray, thin bedded, fissile shale with local limestone and sandstone zones, contains red shale and siltstone in the lower part.

Sbm

Bloomsburg Formation
Red, thin and thick bedded shale and siltstone with local units of sandstone and thin impure limestone, some green shale in places.

Sc

Clinton Group
Predominantly Rose Hill Formation - Reddish purple to greenish gray, thin to medium bedded, fossiliferous shale with interlonguing "iron sandstones" and local gray, fossiliferous limestone, above the Rose Hill is brown to white quartzitic sandstone (Keefer) interbedded upward with dark gray shale (Rochester).

Tuscarora Formation
White to gray, medium to thick bedded, fine grained, quartzitic sandstone, conglomeratic in part.

ORDOVICIAN

CENTRAL PENNSYLVANIA

Oj

Juniata Formation
Red, fine grained to conglomeratic, quartzitic sandstone with well developed cross-bedding and with interbedded red shale in places.

Obe

Bald Eagle Formation
Gray to greenish gray, fine grained to conglomeratic, thick bedded sandstone, often iron-speckled and cross-bedded, some greenish gray shale in places.

Or

Reedsville Formation
Dark gray, olive weathering shale with thin silty to sandy interbeds, black shale of Antes Formation at the base.

Coburn Formation
Dark gray to black, thin bedded limestone with black shale interbeds.

Salona Formation
Dark gray, thin bedded, dense limestone

Nealmont Formation
Bluish gray, finely crystalline, fossiliferous limestone, lower part grades laterally into Curtin Formation

Curtin Formation
Gray, impure limestone, bluish gray, fine grained, high calcium limestone with some larger calcite grains (Valentine Member, Ocv at the top

Ov

Ocl

Benner Formation
Gray, mottled, dolomitic limestone and coarse granular limestone

Hatter Formation
Dark gray, impure, fossiliferous limestone.

Loysburg Formation
Dense limestone over irregularly banded dolomitic limestone.

Bellefonte Formation
Gray, cream to tan weathering, medium bedded dense dolomite.

Ojb

Ocn

Ovl

Scale

0 2 4 6 8 10 MILES

GEOLOGY MAP

REFERENCE:
GEOLOGIC MAP OF PENNSYLVANIA PREPARED BY COMMONWEALTH OF PENNA. DEPT. OF INTERNAL AFFAIRS, DATED 1960, SCALE 1" = 4 MILES

GAI CONSULTANTS, INC.